

COMPUTERWORLD

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Price Cuts to Save Some IBM Users 30%

By Frank Piasta
CW Staff Writer

WHITE PLAINS, N.Y. — In an attempt to make the purchase of currently leased equipment more attractive, IBM has cut purchase prices on several of its out-of-production products an average of 30%. The cuts will primarily affect users who want to switch their units from lease to purchase.

The largest reduction was made in the price of the 2361 bulk core storage, which was cut 40%. Formerly priced at \$296,385 and \$493,970, the memory units now cost \$177,830 and \$296,380.

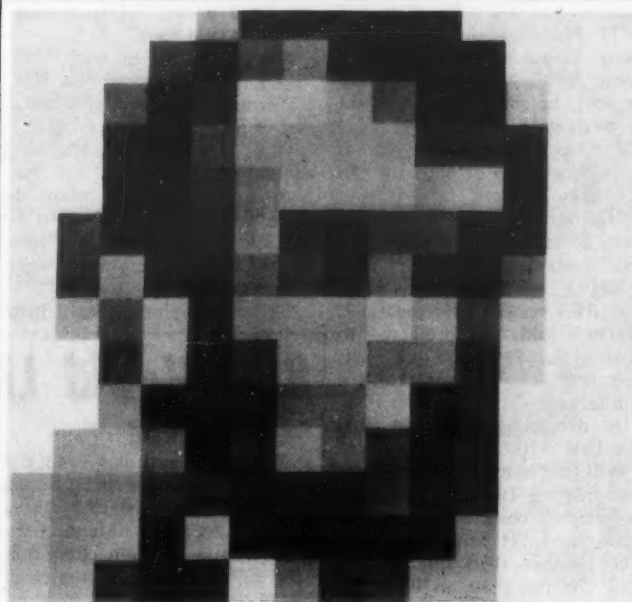
The original configuration of the 2314 disk drive system, the nine-drive 2314-1, withdrawn from the company's product line some time ago, was reduced 25%, from \$237,105 to \$177,830. The 25% reduction will apply only to current lease customers who want to purchase their previously installed 2314s.

Two series of processors were also lowered in price. A reduction of 30% was made in models 1, 2, 3, and 4 of the 360/20. Formerly ranging in price from \$22,865 to \$56,830, the units will now sell for \$16,005 to \$39,780.

The scientifically oriented 360/44 was cut in price 25%. The new price range is from \$87,220 to \$311,700. The old prices ranged from \$116,295 to \$415,595.

IBM said that reconditioned models of the above equipment, except for the 2314-1, would be available to purchasers on a six-month delivery schedule.

The standard credit options on installed equipment would apply to users who elected to purchase their equipment, IBM added. These discounts amount to 12 months' rental to commercial users and 24 months' rental to federal, state, and local governments.



Good Likeness

The portrait of a famous craggy face has been precisely blurred by a computer as part of an experiment by Leon D. Harmon at Bell Labs to determine the least amount of visual information a picture may contain and still be recognizable. Studies of "information content" of an image may be useful in devising techniques for computer storage of pictures. The portrait is divided into about 200 squares. To recognize the picture, try looking at it from nine feet or more, or while it's in motion.

DP Figures In Bank Loss Of \$128,000

By Michael Merritt
CW Staff Writer

TRENTON, N.J. — Five persons, including the bank's assistant vice-president in charge of computer systems and the senior computer operator, have been arrested in connection with the alleged embezzlement of \$128,000 from the New Jersey National Bank.

According to Karl Nestler, director of security for the bank, "a knowledge of the computer system effected this — they couldn't have done it without access to the system."

Charged with embezzlement were William R. Patton, 40, an assistant vice-president of the bank, and Lawrence Pagliaro Jr., 25, the senior computer operator. Both pleaded innocent at their arraignment, and were released on \$30,000 bail each. Three "outside men" were charged with obtaining money under false pretenses.

The alleged embezzlers, Nestler said, transferred money from infrequently used savings accounts to accounts opened by the outside men. After the exchange the new accounts were closed out.

Nestler said that the alleged embezzlers had intended to destroy all records of the transaction, but slipped up. The holder of one account noticed that it had shrunk from \$18,000 to \$12,000 when he was sent his statement. After he complained

(Continued on Page 2)

Common Carrier Gets Data Link Approval

By Ronald A. Frank
CW Technical News Editor

WASHINGTON, D.C. — The Federal Communications Commission has removed the last existing roadblock preventing Microwave Communications Inc. (MCI) from offering data services to users between Chicago and St. Louis.

In a move announced Jan. 21, but apparently taken earlier [CW, Dec. 23] the FCC approved 11 microwave stations which MCI will use to provide point-to-point service to computer and other data users.

The FCC decision will allow MCI to begin operating by late spring of this year. The MCI link will put the specialized common carrier into competition with the Bell system for the first time. AT&T has appealed the MCI authorization in Federal court.

The Chicago to St. Louis link was originally authorized by the FCC in August 1969. Since then a series of objections and requests for reconsideration by AT&T and other common carriers has prevented MCI from constructing its facilities.

An MCI spokesman told CW that the FCC approval would pave the way for final construction of the microwave sites. He said that service could begin by early June.

The FCC has authorized MCI to operate the equivalent of 300 voice channels, out of a total capacity of 1,800, between Chicago and St. Louis. MCI already has potential users for all of the authorized channels, a spokesman said, adding that a majority of these users will probably use the link to transmit computer data.

A spokesman for Raytheon, which will construct microwave equipment for MCI, told CW that about six weeks would be required to complete "testing, alignment, and acceptance of the equipment."

Beginning in June, users who subscribe to the MCI service will need to interconnect via local Bell lines. A spokesman for Southwestern Bell, which serves St. Louis, said plans are currently being completed to interconnect MCI customers.

He added that the June date "sounds reasonable" for Bell to provide local loop service to the

first customers.

An Illinois Bell spokesman said that discussions concerning local loops had been held with MCI but would not comment further.

AT&T notified MCI last September that local Bell companies would cooperate in planning the interconnection of users with MCI facilities.

Although FCC approval has now been granted, the objec-

tions of AT&T and other carriers to the MCI service are expected to continue. Still pending in the U.S. Court of Appeals in Washington is the objection to the Chicago to St. Louis link by AT&T.

One industry observer told CW that the court will now probably hear the Bell complaint, but it "is unlikely that it will rule in favor of the phone company."

Power Problems

Stoppages Beset Dartmouth T/S

By Edward J. Bride
CW Staff Writer

HANOVER, N.H. — For lack of a power supply testing device, the entire Dartmouth Time-Sharing System (DTSS) was disabled for two days.

Cause of the breakdown, which occurred late last year, was on-line testing of a spare power supply for an I/O interface controller. The schematic wiring on the power supply was apparently erroneous, and "transients" resulting from improper voltage were introduced into the system.

Dozens of integrated circuit chips were blown by the resultant power surge.

The same trouble had occurred about six months prior.

Dr. Robert Hargraves, associate director of the Kiewit Computation Center, said the wiring terminal designations were not the same on the spare and primary supply units, and the incorrect voltage was therefore supplied to the spare unit when it was placed on-line for testing.

Hargraves told CW that a testing device had not been built or ordered, because Honeywell has decided to replace the Datametrics controller with one made by the Apollo Control Division of

General Electric.

Datametrics made the device under contract to GE, whose computer operations have since been acquired by Honeywell.

Prof. Thomas Kurtz, director of the Kiewit Center, promised "reliability should noticeably improve" when the replacement is made, "since most of the serious troubles of the past 10 or 11 months can be traced to the Datametrics controller."

'Serious Troubles'

Hargraves said the other "serious troubles" included "internal logic design errors" and "marginal timing" on the I/O interface unit.

He said there was no estimate as to when the Apollo division's unit might be available, since Honeywell would probably have to start a production line for the controller. Personnel from GE's Apollo Support Division in Phoenix assisted in solving the crisis.

The system was in full operation again five days after the problem first occurred.

The power problem overshadowed completely a previous four-hour system stoppage, which in itself

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Called Questionable

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Trend to 'Buyers' Market' Produces Finicky Users

By Thomas J. Morton
CW Midwest Bureau,

TULSA, Okla. — There are indications which show that a trend towards a "buyers' market" could be coming to the DP industry.

More and more, users are showing more interest in results than in new hardware, and strict adherence to contracts is figuring prominently.

Blue Cross-Blue Shield here is a case in point.

The decision to investigate the installation of a new system at

Group Hospital Service and Oklahoma Physicians Service, according to Mark Marcum, vice-president in charge of research and information, was based chiefly upon economy of operation.

Prior to unbundling, Marcum said his firm was spending about \$600,000 for an IBM 360/40 system, and his projections for 1971 indicated that his operations unbundled would cost about \$721,000. That increase in cost, he said, prompted him to investigate.

Marcum admits that he is saying "put up or shut up" to the manufacturers.

His investigation of cost reduction, he said, narrowed down to the installation of an IBM 370/145 system or an RCA Spectra 7 system. The Spectra 7, Marcum said, was projected to cost under \$600,000 per year, but neither system is available for delivery yet.

He determined, he said, that the IBM 370, with a new 3211, 2,000 line/min printer replacing his existing two 1403s, would reduce the costs on his 360/40 operations. "It would," he said, "be cheaper than the 360/40, and cheaper than an RCA 46. But it would be more expensive than the RCA Spectra 7."

IBM to RCA

His problem, then, would be going from an IBM system to an RCA system. Could it be done to his satisfaction? According to Marcum, RCA said it could and that was when he said, in effect,

"Okay, RCA, prove it!"

He expanded his computer facilities, and gave RCA a contract that he had drawn up to install a Spectra 46 and have it run in parallel with his 360/40. In essence, Marcum said, the contract required the 46 to perform as well as the 40, or out it would go.

"And if it did," Marcum said, "we send IBM back."

"Our contract," he said, "borrowed liberally from the U.S. Government contract. We had a test of performance clause in it."

RCA, according to Marcum, didn't want to pick up that contract and have to adapt its operations to his clauses. RCA, he said, switched to its own contract and attempted to write his clauses into it.

"It has evidently lost a little

something in the translation," Marcum said, and explained that his lawyers are now rewriting the original contract for resubmission to RCA.

A spokesman for the government's General Services Administration (GSA) explained that in the Federal Supply Schedule contract there is a clause referred to as the acceptance testing period clause. "That clause," the GSA man said, "says that the computer has to perform at a 95% effectiveness level."

The time period, another government man said, was 30 days.

The contract Blue Cross submitted to RCA asked that a System 46 perform effectively for a 30-day period.

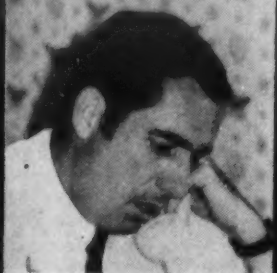
Marcum said it all came about because the RCA representatives claimed that the 46 would out-

perform the 360/40. "They gave me," Marcum said, "all that benchmark jazz, which frankly I don't have too much confidence in... you can do too much modifying in your programs."

"We want a 46 in parallel with that 40, in the same atmosphere. We'll do the double input. All the trauma [of the test period] will be confined to EDP. We don't want the using departments to be able to tell the difference."

If the conversion is successful, Marcum said, Blue Cross in Tulsa plans to install an RCA 7 and an RCA 3. As yet, RCA has not accepted the Blue Cross proposal and no RCA equipment has been installed.

An RCA spokesman said he preferred not to comment on the Blue Cross matter.



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Bill Would Limit Credit Card Practices

SACRAMENTO, Calif. — A state senator who has been victimized by computerized billing systems is fighting back by filing three new bills to defend credit card customers from computerized billing errors and the rigidity of the systems.

Sen. Alfred Song (D-L.A.) is supported by Sen. Gordon Cologne (R-Riverside), who has also been bitten. The bills were well received in the Senate.

In declaring war on credit card companies' computers, Song said, "They just ignore the hell out of you." The bills will make

the companies subject to damages if they fail to correct errors.

- A firm would be required to correct errors in billing within 30 days after being informed of the error. If it failed to do so, it could be taken to court and sued for triple damages.

- Providing incorrect information about a credit card holder would be prohibited. A firm would be subject to triple damages if it gave out the informa-

tion inadvertently and would be guilty of a misdemeanor if it willfully gave out the information.

- Credit card firms would be required to post \$100,000 bond with the state to assure payment of damage suits they would lose.

Song, in relating an unsuccessful, six-month attempt to rectify a computerized billing error, said: "I finally just turned in my card."

DP Instrumental in Embezzlement

(Continued from Page 1)

to the bank, the subsequent internal audit revealed other discrepancies, and turned up statements that the alleged embezzlers had failed to destroy.

Detective John Kennedy said he had arrested Pagliaro on Jan. 15 and Patton on Jan. 25.

Bank President Richard McGill said that the 33 accounts that had been tampered with were all covered by insurance. There has been no restitution of the money allegedly embezzled.

The alleged embezzlement was detected because conversion of the bank's computer from two NCR 315s to a Century 200 disrupted the normal work schedule.

The embezzlers had apparently counted on the savings statements being available over the weekend of Jan. 1 so that they could remove the statements showing the withdrawals and substitute falsified statements. Because of the conversion, the

statements were printed late and immediately mailed, however.

Outages Hit Dartmouth T/S

(Continued from Page 1)

"would be a signal for grave concern," noted Kurtz. That stoppage occurred a day earlier, and was traced to a faulty register board and a bad clock board in a Datanet-30 controller. The faulty components caused core clearing on the Honeywell 635 computer when it was communicating with Teletype terminals, according to a Dartmouth software engineer.

One of the spare circuit boards was faulty, the engineer said, and the system had to be shut down to fix it. The engineer said it was a "logic design deficiency" that allowed a peripheral to clear out the core of the computer, but that it only happened "once or twice a year."

10,000 Residents Shake Heads at Erroneous Bills

LEXINGTON, Ky. — "Too complicated to explain... but the computer went awry," often translates down to "nothing to do with computers... bad communications," when looked at a little more closely.

It happened again here recently, when the Louisville Courier-Journal reported how the "computer went awry" in figuring out about 10,000 sewer bills.

Behind the foulup was the city's highly touted removal of the sewer charge at the end of 1970. When city commissioners pushed through the elimination of the charge, they apparently didn't take into consideration a

method or policy for computing the final quarter.

Water meters are normally read every quarter, and first reports indicated the computer was programmed to estimate the sewer charge on the basis of a previous quarter.

Sewer and water services are provided on a contract basis by the Lexington Water Co., which based sewer charges on a percentage of water consumption.

Somehow, conflicting sets of instructions were apparently given to the computer personnel at the company's parent business, the American Water Works, of Richmond, Ind.

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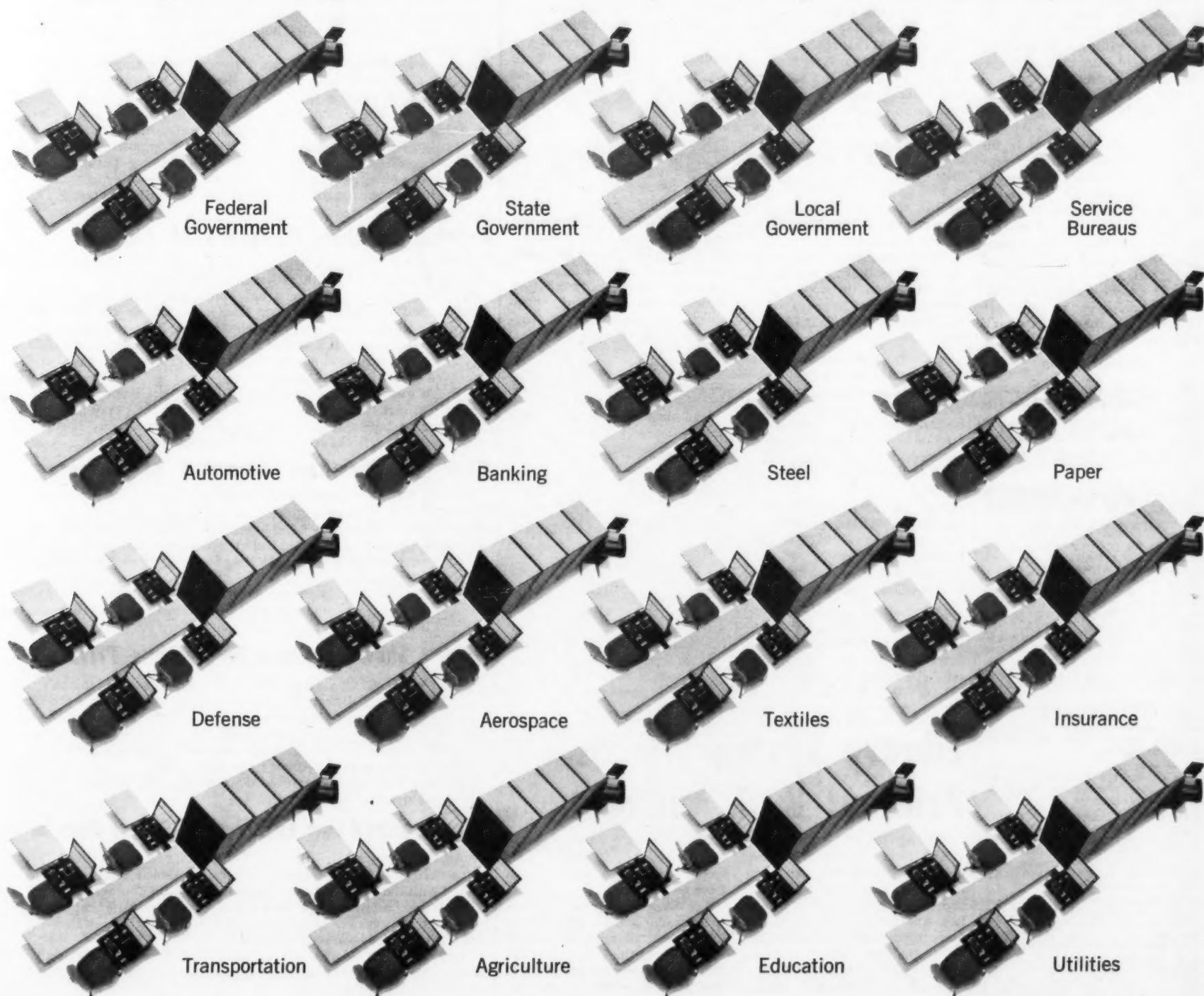
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Corporate Computer Problems

Top Management Must Lead

By Thomas J. Morton
CW Midwest Bureau

CHICAGO — "The current economic slowdown," said William C. Benton, in charge of management information services at the Chicago office of Fry Consultants, "has shown that not all the problems of EDP or MIS are related to hardware or systems development, but that, perhaps, they stem from management. "And not necessarily entirely in EDP/MIS management, either."

Fry Consultants Inc. is an international organization of professional consultants to management, especially on the executive management levels.

"We're on the verge of moving a new technology into utilization," Benton said. But he added that there was a definite need for the executives of a corporation to take over the computer to make sure that the company is getting its money's worth.

Control System

He cited a case in which top management, aware of forecasts of declining sales, decided that a manufacturing control system should be developed to reduce

manufacturing costs by reducing delays with various manufacturing sections in production.

According to Benton, the system was specified five years ago, and those five years were spent in trying to implement the system but this never happened.

He said that top management had been told that such a system could be developed within one to two years. Benton said that the failure was caused not by that corporation's executives being unaware of materials flow, but rather because of ignorance of proper procedures for information flow.

"Management control," said Benton, "is really leadership. It does not mean that all the information flows up to the top. That is merely informing. When information goes both ways, to the top and from the top, that is influencing what happens within that organization. That's leadership."

One very large company, Benton explained, decided, upon orders from its president, on how to implement a major reorganization, in which the whole method of selling would be changed, and, in particular, a new method of paying sales personnel.

While all the planning for the reorganization was being done, no one thought to consider EDP/MIS. Everything was set up, and the orders to change on a certain date were given.

It still hasn't happened because, Benton said, everyone, including the president, had no knowledge of the complexities of systems development. "Here," said Benton, "we have technicians, not top manage-

ment, setting the pace of the change. Ultimately it is a failure of management in planning and control."

The fault, Benton said, lies in the lack of communication between top management, corporate function management, and the management of EDP/MIS.

Top management, according to Benton, has the responsibility to apply to EDP/MIS within an organization the same standards and measures that would be applied routinely to any other segment of the business.

Top management must identify the long-range goal of the organization to all concerned, including EDP/MIS management, he said.

To truly utilize the corporate computer, Benton said, top management and the management of corporate functions (marketing, finance, manufacturing, planning, etc.) must identify strategic objectives and functional improvements needed to achieve the organizational goals to the management of EDP/MIS.

Combined, the three management must identify needs and opportunities for EDP/MIS to support important organizational functions.

The manager of EDP/MIS, Benton said, has the responsibility to determine and communicate the future manpower skills and EDP capacity needed to best support the objectives and goals of the corporation.

He maintains that a viable, continually active plan and program of communication between top management and functional management with the management of EDP/MIS is the key to effective utilization and control of the corporate computer.

Library System Avoids Printout With Microfiche

LOS ANGELES — "Just since 1967 library computers have produced enough paper to reach from Los Angeles to Chicago," said Pat Galati, president of the Los Angeles City Board of Library Commissioners as he unveiled the first fully computerized library system in the nation. The new system uses microfiche instead of hard-copy printout, and in addition to saving a lot of trees it is expected to save the taxpayers an estimated \$100,000 a year.

High Volume

The volume of paper printout needed for library management is illustrated by these examples: book history reports were running over 5,000 pages monthly; system ordering over 2,000 pages weekly; and page and directory reports roughly 25,000 pages on a quarterly basis. And that was only the beginning. The library has to keep track of 1.2 million card holders.

Previously, data on delinquent book borrowers was two to three weeks late. Now it is maintained on a current basis.

Due to the cost of reproducing the reports and distributing and storing them, library branches were having to do without

needed information unless they called the central library. This meant having to handle calls from 61 branches.

Now each branch has a microfiche reader and receives regular distribution of relevant reports. In addition, there is a tremendous saving in storage space as 208 pages of computer data can be reduced to one 4 by 6 in. microfiche card.

Update of State Laws Gets Assist

ROCHESTER, N.Y. — Many states already have their statutes on computer tape, but a project begun by the Lawyers Cooperative Publishing Co. here may revolutionize the way a state's laws are recorded and changed.

The Rochester legal publishing company will help the State of Mississippi update and recodify its entire 30-year-old statute system.

This is reportedly the first time a state has ever contracted with an established lawbook publisher to do a complete editorial revision and recodification using computer equipment.

News Wrapup

Strike at Harvester Continues

CHICAGO — Tentative agreement has been reached on new wage terms for production workers at International Harvester Co., but the company and the United Auto Workers (UAW) are said to be no closer to settling the strike.

While the union and the company have come to terms, and while most of the locals have voted for ratification of the national's arbitration efforts, some locals, like Columbus, Ohio, and the production workers in Fort Wayne, Ind., have not ratified the agreement.

A company spokesman said that Harvester was taking the position that all locals would have to ratify the terms before the company would renew operations.

The strike against Harvester by the UAW was expected as a matter of doing business for the truck manufacturer, but it has hidden ramifications for the computer industry. Computer operators, keypunchers, and about half of the programming personnel at Harvester are union members and, thus, are on strike.

Harvester DP managerial personnel are currently operating the centers.

Political Squabble Threatens DP Contract

NEW YORK — Decision Systems Inc. is caught in a political fight and stands to lose a \$70,000 programming contract.

All consulting contracts must be approved by both Mayor John Lindsay and Controller Abraham D. Beame. Beame says that the Board of Estimate must approve such contracts before he can accept them. Lindsay says that Board of Estimate consideration violates the city charter, and he will not approve any contracts which have been approved by the Board of Estimate.

And Decision Systems is caught in the middle. Beame wants to issue a contract to Decision Systems to update the payroll system, because an agreement with the union representing city workers requires that paychecks carry more information by April 1.

Two CPP Members Acquitted of Littering

NEW YORK — Two members of Computer People for Peace have been acquitted of charges growing out of an April 11, 1970, antiwar demonstration. Stuart Davis and Kenneth Thomas were charged with littering when they distributed leaflets protesting "war profiteering" by GE and Honeywell. But leafletting is not littering, so the judge dismissed the charges.

"Police know they can't get convictions," charged Davis and Thomas, but they continue with arrests and summonses "to harass political leafletters."

Report Shows Concern for Campus Privacy

PALO ALTO, Calif. — Increased use of computerization in student records has raised the question of privacy on college campuses.

At Stanford a report has been released on "Privacy and Student Records at Stanford." The report declares, among other things, that a student's transcript should not be released to parents or financial backers without written consent from the student.

The study stems from a Stanford workshop on "Social and Political Issues on Privacy in the Computer Age."

Computerized Law Enforcement Grows Popular

WASHINGTON, D.C. — Twenty-five states now have their own computerized law enforcement systems, modeled after and connected with the FBI's National Crime Information Center here.

The largest is California's, which went into operation last spring and which utilizes over 20,000 miles of transmission lines. New York and Michigan also have huge systems.

Every state but Alaska is connected with NCIC, with Hawaii's "connection" via Intelsat, the communication satellite orbiting 23,500 miles over the Pacific.

Supplier Sees Few County Betting Problems

NEW YORK — Three counties in upstate New York, in addition to New York City, have also approved offtrack betting. U.S. Data Corp., the computer supplier, predicts that it will have an operating system for these counties by March 8, without the difficulties that have plagued New York City.

According to U.S. Data President Paul A. Costello, since the cities and counties are effectively in control of the offtrack betting in their own communities, the clerks will be hired by those governments.

This should prevent any jurisdictional labor disputes, he said, as the cities and counties already have union contracts for all employees.

Weather Forecasting Research Advances

LONDON — Initial tests with a method for forecasting the weather conditions accurately five to seven days ahead have proven successful.

Dr. B.J. Mason of the Meteorological Office has described trials by one of his teams using a 360/195 computer.

Still several years away from general use, the system depends on a plan for calculating long-range weather conditions by analyzing thousands of measurements of wind speeds, atmospheric temperature, pressures and other data from a global network of observation stations.

A mathematical model of the weather picture is then constructed.

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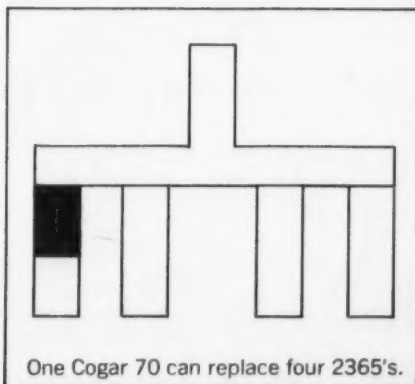
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Some Spying Continues

Army Data Banking Curtailed, But Legislation Lacking

By Joseph Hanlon
CW Staff Writer

WASHINGTON, D.C. — Data banking of civilians by the Army has been sharply curtailed — temporarily. But much of the data still exists, and there is apparently nothing to prevent surveillance and data collection from being resumed at any time. Some Army Intelligence officers have squirreled away data in violation of orders to destroy it. In one case agents destroyed a printout as ordered, but microfilm it first so that they could keep a copy.

Common practice in the intelligence community has been to lie to superior officers and the press in an effort to cover up

data banking.

Many former Army Intelligence officers believe that spying on civilians will be limited only until the matter is forgotten by the newspapers, and then intelligence activities will return to normal.

These conclusions result from an intensive CW investigation, which included interviews with several ex-Army Intelligence agents. Some of them were involved in the Defense Department's own investigation.

18,000 Names

At the height of data collection a year ago, the Army had information on 18,000 American civilians, most of whom were on

file for participating in lawful political activity. Data was filed in dozens of manual files and at least four computer data banks.

During the past year, the Army has slowly admitted to more and more of this activity, and has discontinued use of most of its surveillance apparatus.

However, the Army's primary interest apparently is not in ending surveillance, but in avoiding publicity. One action is probably typical of the Army response: according to ex-agent John M. O'Brien, the 113th Intelligence Group spied on reporter Morton Kondracke because he wrote articles in the *Chicago Sun Times* exposing Army spying and data banks.

Pattern of Deception

The most amazing aspect of the entire year-long controversy was the inability of the Army to find out about its own computers. This resulted from a pattern of lies and deception within the Army and the Department of Defense.

Committees organized last year within DoD to study the problem found that intelligence officers lied to them. Then the committees lied to their own superiors.

One such committee was appointed in January 1970 when the first article was published in the *Washington Monthly*. This task force was to inform the Army if the article was correct, and to answer inquiries from the press and senators.

An intelligence agent, Edward Sohler, was a clerk for that task force. Now out of the Army, he described his experiences to CW: "We were getting inquiries from all sorts of people, including senators, and we didn't give any of them straight answers. The task force even lied to (Army General Counsel Robert) Jordan because they were afraid he would be too

honest with the press. They tried not to tell him anything that had not already been in the newspapers.

"The intelligence community simply did not want this information released; they would not tell anybody unless forced into it. The hardest decisions for the people in the task force were: 'How much are we going to admit?'"

Based on his experience, Sohler predicts: "If laws are passed, the Army will probably follow them. But without legislation, this will happen again. When things cool off in the press, the regulations can be changed and the computers reactivated. But the next time the Army will keep their activities better hidden."

Data Banking Continues

Sources inside Army Intelligence confirm that spying on, and data banking of, civilians has been sharply reduced. But some spying continues. Because of concern about antiwar activity in the Army (generally known as Rita — Resistance in the Army), Army Intelligence agents are still spying on lawful actions of politically active civilians who come in contact with GIs, particularly at coffee houses near Army bases. And some other spying apparently continues despite Army orders.

Finally, it would appear that data banks exist outside the Army. Reliable reports indicate that Air Force Office of Special Investigation (OSI) units at several Air Force bases keep intelligence data on civilians in machine-readable form. Unlike the Army data banks, however, these are not dedicated systems; probably OSI uses time on base payroll and inventory computers.

4 Computer Files

At the peak of activity last January, the Army maintained four large computer data banks. Three of these, at Forts Holabird, Hood, and Munroe, were unplugged last spring in response to protests.

The fourth file, maintained by the Counter Intelligence Analysis Detachment (Ciad), presented more of a problem. The file itself consists of 250 reels of microfilm, containing both domestic and foreign intelligence, with a computerized in-

dex which is updated monthly.

As domestic and foreign intelligence were randomly mixed, it was impossible to simply destroy certain microfilm rolls. Army General Counsel Jordan estimated that it would cost \$15,000 to carefully cut out the objectionable frames from the microfilm, so that course was rejected.

But Jordan noted that without an index, the microfilm was useless, so in May he ordered most domestic intelligence purged from the computer index, and old copies of the index destroyed.

Index Microfilmed

But Jordan did not take into account the intransigence of Army Intelligence — agents microfilmed the printout index before destroying it.

Purging the index was not a simple project either. Rather than search all 250 rolls of microfilm, it was decided to merely read the index and punch a "delete" card for each item of domestic intelligence that was obviously objectionable. These cards would be fed to the computer, and when new versions of the index were printed out, the listings of civilians would not be included.

Some listings, such as Mrs. Coretta King and the Poor People's March on Washington, were obvious candidates for deletion. But "the index contains a lot of names, and sometimes you might not know if a guy is a Russian spy or a civilian," noted Assistant General Counsel Ronald Greene. Thus, it is not clear how accurate or complete the purge has been.

Ervin Hearings Feb. 23

The Army data banks will come under strong attack at hearings of Sen. Sam J. Ervin's (D-N.C.) Constitutional Rights Subcommittee beginning Feb. 23. And the American Civil Liberties Union (Aclu) has renewed its attack on the Army data banks. The Aclu appeared before the U.S. Court of Appeals Jan. 20 in Washington to appeal the dismissal last year of its suit against the Army [CW, May 9].

DP Complex Getting to You?

WILMINGTON, Del. — An increase in computer-type complaints is reported by the Delaware Better Business Bureau.

The director of the state office of the national agency said a "computer complex" is developing in consumers who get the feeling they are corresponding with a machine instead of a human being.

John E. Babiarz said the most common computer problem occurs when a consumer requests or sends information about a bill, but receives only a form letter in reply, thanking him for the business, and telling him to write if anything is wrong.

"It's not the computer, it's the programmer, who is usually so busy she gets her correspondence mixed up," Babiarz observed.

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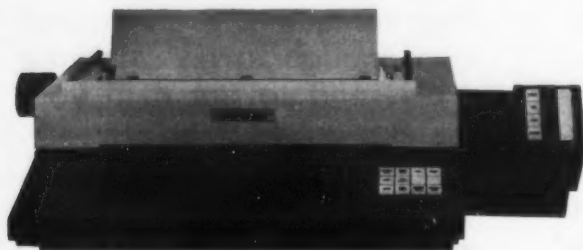
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IRS Readying Tax System of the '70s

ANDOVER, Mass. — The regional service center operated here by the Internal Revenue Service used to buy one computer card per year for every man, woman, and child in the country.

Multiply that by the seven regional centers and there are almost 1.5 billion cards annually which will not be purchased, and not be disposed of, as a result of the Direct Data Entry (DDE) system being phased into the country's tax collection agency.

Some of the regional centers already utilize DDE, but a more impressive and sophisticated advancement is in the works, under the title of TAS '70.

This "tax administration system of the seventies" is being codesigned by IRS and Mitre Corp. of Bedford, Mass., and, according to the contractor, will have the following features:

- A data base of at least a

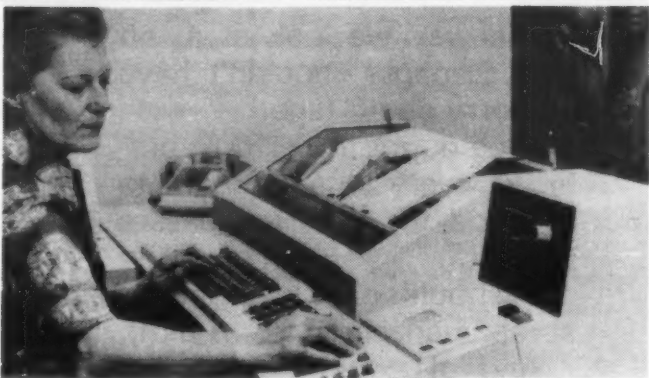
trillion bits, with numerical and technical information.

- A transaction and inquiry rate of at least 100,000/hr.
- File integrity and security.
- Multi-user access (from different organization units).
- On-line access, nationwide.
- High reliability, with growth potential.

A bimonthly Mitre publication (*Matrix*) said the company is using computer modeling to help determine the most beneficial of

the several alternatives being studied for TAS '70.

A "super center" is one of the alternatives, according to *Matrix*, with the regional centers continuing to perform the batch transcription of tax return data. The physical location of the massive mass memory is another consideration, as well as "how different locations affect the bandwidth of communication channels," the publication noted.



Travel Time

An IBM system will write tickets and itineraries for customers of Woodruff World Travel, Inc., a travel agency. While the customer's name and itinerary are fed into the system, the 6430 accounting machine automatically accumulates total fare, computes tax and commission, fills out the ticket, prints the itinerary and bill. It also produces a permanent record in punched-card form containing customer name, account number, ticket number, fare, tax, total and agency commission.

Federal Court To Decide Suits Of DP Schools

PITTSBURGH — When the bickering between schools got serious, one suit led to another and now a federal court has to decide.

Contemporary Institute Inc., which operates six Electronic Computer Programming Institute schools here, was sued last year by the New York-based school franchiser for failure to pay a claimed balance of \$95,000 on supplies and material Contemporary allegedly received.

Epci also claims that Contemporary owes it \$42,748 in royalties for the first quarter of 1970.

Contemporary has filed a countersuit in federal court here.

DP Net Would Aid Drug Education

CW Midwest Bureau

ALBANY, N.Y. — A New York State educator feels one of the best ways to combat student drug abuse is with knowledge of drugs in the hands of teachers and that the best way to get that knowledge into those hands is by means of a computer.

Dr. John Sinacore, drug education director for the New York State Education Department, explained his views to a board of regents meeting here recently. Sinacore said that quick help for

a drug education teacher who has students with a particular drug abuse question could be obtained through a statewide computer network.

"A teacher would order the specific information she wants through the computer system and would receive a learning package in the mail," he said.

Eventually teletypewriters would handle both the interrogation from a teacher and the output printout.

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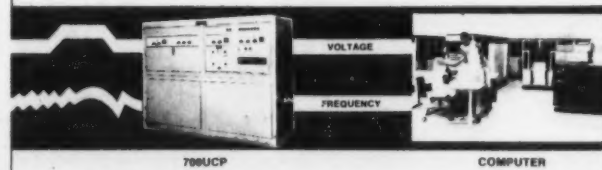
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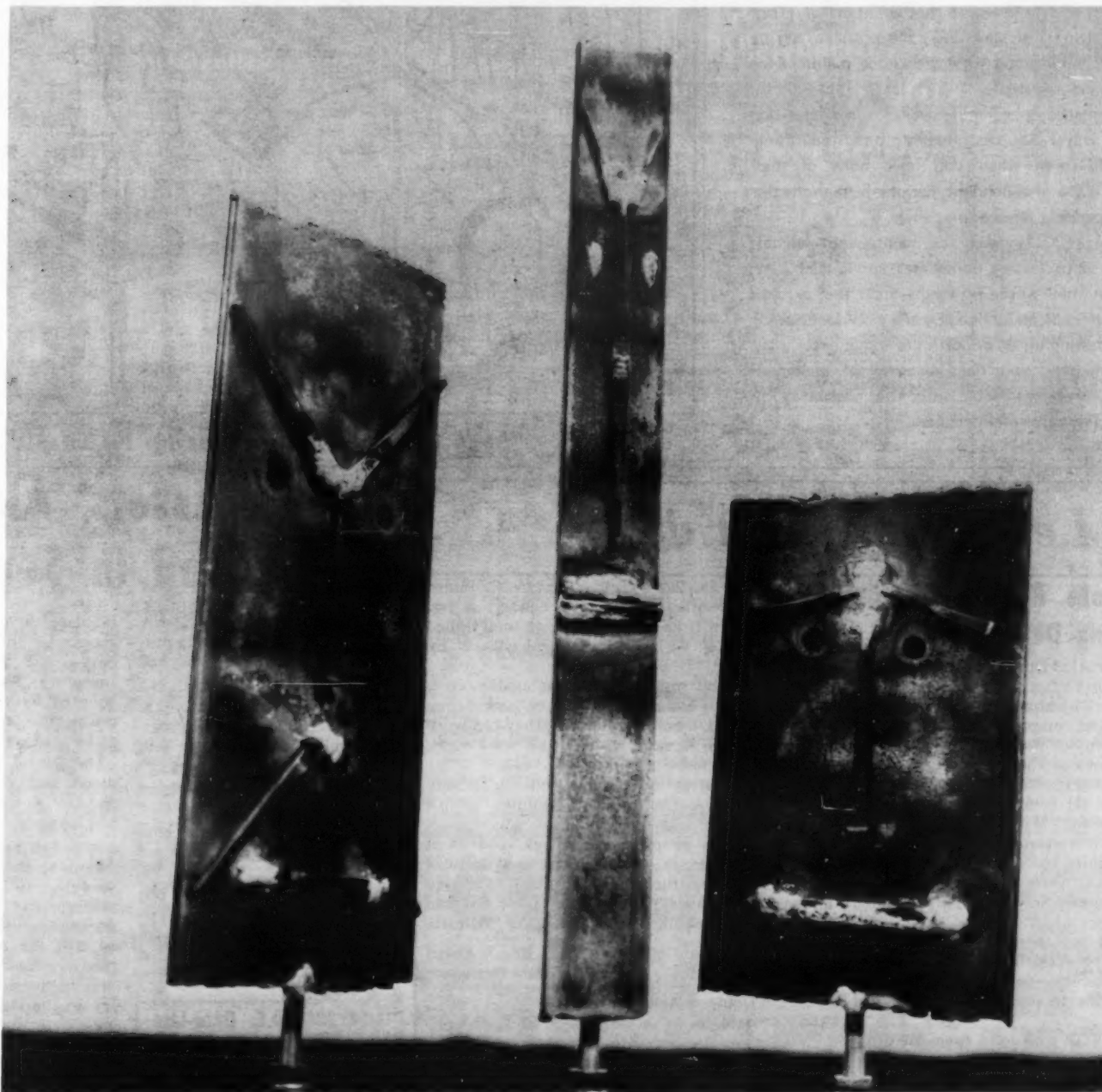
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- a workload profile
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- Unit Costing reports (easily adjustable to changing price factors)
- a revenue simulation capability

So far, we have mentioned only the most basic PACES system. However, PACES is available with many optional features at many price levels. Please inquire as to which configuration would best suit your desire for system control.

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Please contact me.

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Editorial

Single-Source Maintenance

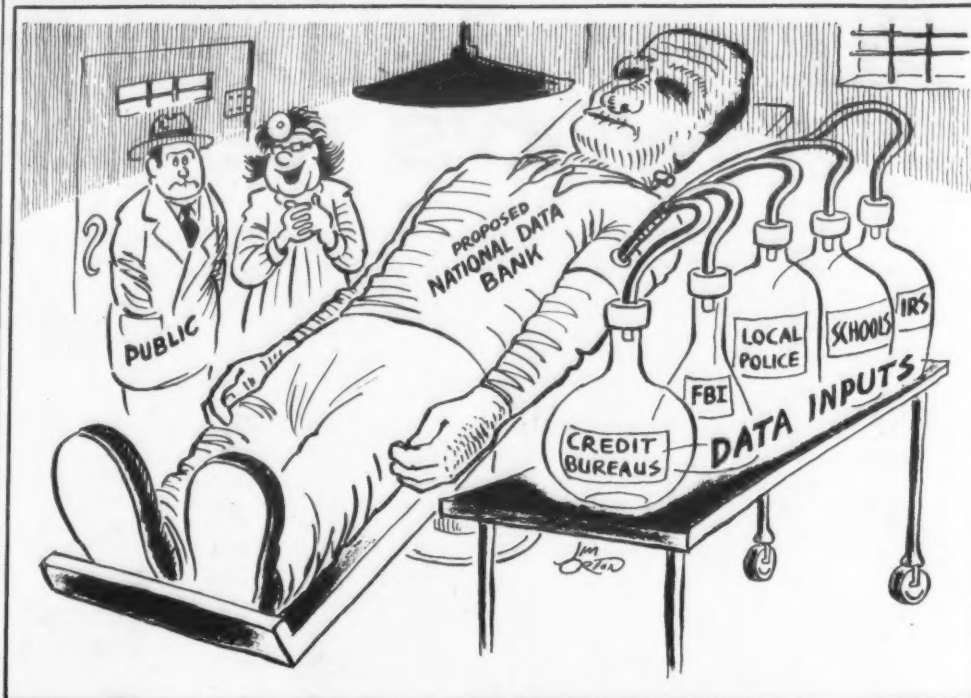
For some users, the fear of horrendous maintenance problems has overshadowed the dollar savings to be gained by going to mixed-vendor systems.

Although experience indicates that maintenance is not a major problem [CW, Jan. 20], the problem can be averted entirely by going to single-source maintenance for a mixed-vendor system.

Such maintenance is becoming available in a surprising number of ways. Sources include some mainframe manufacturers (even when you have none of their equipment), some independent peripheral manufacturers, and independent service companies.

Another barrier to single-source maintenance fell last month when four leasing companies announced [CW, Jan. 27] that they would no longer insist that systems leased from them be maintained by the manufacturer.

So before passing up an opportunity to get exactly the mix of equipment you need because of a fear of maintenance problems, look into the possibility of obtaining single-source maintenance.



'Now If Congress Will Just Provide the Blood...'

Letters to the Editor

Entry-Level Jobs Requested By DP Training Director

The main thrust of Alan Drattell's article on TOP (Training for Opportunities in Programming Inc. [CW, Dec. 23] was "opening the door of opportunity" in the field of computer programming for people in the inner-city of Washington, D.C.

We need jobs — jobs at the entry or "shadow" level in computer programming.

The response from the computer community has not been overwhelming. Major advocates of the disadvantaged and underemployed have not followed up their words by deeds — jobs. Univac (Apollo) and the D.C. Government (Systems Development and Computer Services) have responded to our call for help.

But these jobs are not enough. To obtain social justice for inner-city residents, TOP's graduates need more jobs from the computer community, and today is the time to respond to our cry for help — jobs.

If unable to help TOP with jobs, there are other things one can do.

■ Ask the people who do control jobs to read this letter.

■ Ask friends if they know of any job openings for entry-level positions in computer programming.

■ Volunteer to donate time and effort on our job placement committee.

Questions, suggestions or answers to our pressing problem of enriching the human resources of our community are welcomed. Please feel free to share them with me by writing: Herbert Drucker, TOP Inc., P.O. Box 848, Adelphi, Md. 20783.

Herbert Drucker

Adelphi, Md.

Did Programmer Like Women?

Reference the news item [CW, Dec. 9] that a computer for Franklin County in Columbus, Ohio, had chosen all women as jurors.

I would say that it is a matter of very simple programming if the first name is available.

If the last letter in the first name of a person is "a," "e," or "y," then there is a 99% chance that it is a woman. This small bit of character testing could be inserted in a program and not be noticed by anybody.

K. Srinivasan

Jamaica, N.Y.

Maybe Women's Liberation patched the program. Ed.

Takeover by Robots Predicted

Regarding the editorial, "The Robots are Coming" [CW, Dec. 16], from now on there probably

will not be an "un-awful" time to announce job-stealing robots. Once their technology is perfected, there will be no unskilled or semi-skilled job that cannot be done better and cheaper by robots.

Robots exhibit wonderful characteristics common to all computers: they are rarely "sick," they never go on strike or ask for a raise, they can work 24 hours a day as easily as they can work eight, and they are superbly accurate.

Robot technology is certainly well on its way toward practical usefulness. Computer people should get together with economists, sociologists, public relations people, businessmen, and other people interested in the problem and devise a viable plan for restructuring our society to accommodate an inexhaustible supply of slave labor, and to prepare the public for acceptance of the plan.

Eric S. Fisher

Director of Data Processing

Michigan Dept. of Mental Health
Ann Arbor, Mich.

Supplier's Price Also Factor

The article "Telex Reductions to Cut Into Profit Margins" [CW, Jan. 20] was meritorious but failed to indicate that Telex would not absorb the full reduction. It is my understanding from talking with the officers of Telex that their supplier, ISS, is granting a price reduction on this type of drive system effective immediately.

William G. Schaefer, C.F.A.

Drexel Harriman Ripley Inc.
Philadelphia, Pa.

ISS confirms that it has made a "price concession" of a substantial nature. Ed.

Typesetting Seen Beneficiary

The arrival of Peripheral Equipment Corp.'s line of digital magnetic tape transports and Digital Equipment Corp.'s announcement of a magnetic tape drive system — both IBM compatible — is perhaps an indication that there is hope for the development of the computerized photocomposition world.

One of the biggest advantages of computerized typesetting is the retrieval of existing computer data that must be published without the introduction of human errors from retyping.

Now data from a large computer system can be economically typeset by a small computer system; that is, if the software is available.

Congratulations and thanks to PEC and DEC for making the hardware available.

AGS Consultants, Inc.
Blue Bell, Pa.

Ann Smullen

Project 'Assets' Aids DP Unemployed in Search

WASHINGTON, D.C. — A management analyst in data processing, with an M.S., who had been earning \$16,000 a year.

A digital designer with a B.S. and an \$18,000 salary.

A systems analyst with a B.S. and a \$21,000 yearly income.

Another systems man with an \$18,000 salary.

A software design specialist with a B.S. and a former income of \$17,000.

All of these men are now out of work in nearby northern Virginia, victims of the current economic downturn.

The Commonwealth of Virginia, recognizing the problem, has initiated "a supplementary system" to aid technical job-seekers who have been laid off or fired.

According to the Virginia Employment Commission (VEC), "The primary industries affected [in the state] by the economic situation so far have been in the scientific-technical research and development fields because of the cutbacks in government spending for defense and space systems and other research projects."

Project Assets

VEC has initiated Project Assets (automated system serving engineers, technicians and scientists) to help displaced technical people get jobs.

While the project is statewide, most of the job seekers, particularly in the computer area, are in Northern Virginia, which is within the Washington metropolitan area.

The system is designed so that resume summaries can be easily fed into a computer. These are

tabulated by career category and geographic location and printed out as the Virginia Manpower Inventory. The inventory is distributed by mail to about 900 prospective employers both in and out of state.

The list of job seekers is updated and published monthly, and is a free service of the employment commission.

It is too early to evaluate response to the project, according to Julius J. Dargusch, assistant manager of the commission's Alexandria office. Dargusch noted that the commission has already received "a fair amount of inquiry, particularly from industry in the District of Columbia area."

Prime Skill Detailed

The commission's mailing to prospective employers details the prime skill and specialty of each job seeker. The prime skill involves the sphere of business, engineering, industrial or scientific activity within which a person is best qualified to perform based on his education and experience.

Specialty covers "the particular activity within the broad or basic prime skill area within which a person is uniquely competent to perform."

Regarding expected salary, VEC emphasizes that many of the job seekers will accept lower incomes than they received previously. Many of these individuals "recognize that their former income was inflated by the critical demand for their skills at that time. Their current salary expectations are, in most cases, more realistic in line with the current job market."

Dargusch, in reiterating the state's concern with unemployment among technical people, said: "The guy making \$20,000 a year has some stiff financial obligations, while the individual making \$100 a week gets \$59 a week from unemployment tax-free, so he isn't as bad off."

D.C. Data-Line By Alan Drattell



More Designer Arrogance

Billing System Redesigned May Be Worse Than Ever

One of the examples of arrogant system design published here earlier was the Master Charge billing system, which took over for itself the area on envelopes standardly reserved for postmarks, and then, just to confuse the poor postman even more, punched holes in the card

so that the name and address of the recipient bank could be destroyed [CW, The Taylor Report, Nov. 18].

Now the system has been redesigned, and at least mutilation of the address has stopped. (Funny how often system designers think that they can mutilate cards while calling on others not to!) But the system designer has left its position at the wrong part of the card. This may therefore be considered at least some improvement.

However, after examining the output from the new system I think that matters are worse than ever, which suggests that whatever progress was apparently made was simply accidental resulting from the introduction of OCR equipment, and not from any concern on the system designer's part for the people who have to use his product.

To see the new system, and to compare it with the old one involves looking at three cards, rather than two. This is because the new system was apparently phased in, a part at a time.

The last version of the old system I received was the statement dated Nov. 5 (Figure 1), while the December statement (Figure 2) used the new forms, and had part of the new programming and printouts on it. (See the right-hand side with the phrases about "Merchant Advances To 1500 181500.")

These phrases are not some esoteric form of "chance" card in a Monopoly-style digitized nightmare, but are a replacement for the previously coded categories of purchases to nine characters. Then they will not hinder reader comprehension.

This can be done — simply by using the words used in the

earlier system, "Purchases and Cash" rather than horrors such as "Merchant Advances."

Then, by taking advantage of the colored areas in the way that was intended, the percentage figures can be separated into meaningful data.

And the category data — the "Over 1500" material. This is subsidiary to the main headings of "Purchases and Cash," and should be spaced so as to indicate that it is subsidiary.

It should therefore be restricted to eight characters. This causes no problem for the first line "To 1500," but does cause a problem on the second line "Over 1500" which takes nine character positions.

However, the printing on the form indicates that only one intermediate level (\$1,500) is going to be used, so we do not have to really repeat the value at all. The line can be replaced by "Then" or simply "Over," without any value being included.

And now we are home straight. The results are shown in Figure 5. All that was necessary to bring understanding out of the confusion was a little bit of care and it was not given.

Translate to English

In fact, an even better solution is possible. The current effort indulges such computerese jargon as leaving off dollar signs, using leading and trailing zeroes, etc. — none of which are any part of the written vocabulary of business.

They have no place therefore on outputs to people — particularly where they are not necessary.

Figure 5 shows the first level of improvement in intelligibility that could have been made, but Figure 6 shows an even clearer version which simply translates it into English.

Computer output for Americans should be in English — not computerese.

Balances Don't Balance

Nor is this the only flaw in this incredibly poor system design. Figure 2 shows another bright effort that would have had a student flunked out of the data processing class in many fly-by-night EDP schools.

The balances don't balance! Just try adding up the previous balance, the credits and the payments, and see if you can reach the new balance. You won't — because they don't.

This is not a computing error.

Figures 4, 5, and 6 show the new Master Charge output as it is, and how it could be redesigned to prevent confusing the recipients.

Figure 4 is simply a typewriter version of the original.

Figure 5 shows the changes possible by keeping to the previous terminology of "Purchases" instead of the unnecessary "Merchant Advances," and by using proper spacing, making the two advances agree grammatically, but otherwise leaving the legend alone.

Figure 6 shows what happens when it is translated out of computerese into American English, indicating that it can be done. Barbarisms such as omitting dollar signs, percentages, inserting leading and trailing zeroes, butting up fields etc. are often signs of lazy EDP work, rather than being something that the computer forces on us.

Figure 1. The old card, last issued in November. Note the positioning of the return address, and the punch holes in the address fields. While the name of the Shawmut Bank was able to survive on this card without being mutilated, other banks have not been so lucky.

Figure 2. The first new card. With the use of optical scanning the mutilation of the address field has now stopped, but its non-standard position continues. The explanation of the advances and their finance charges is repositioned, but only part of the legend appears as yet. The card shows that the system can produce and send out bills even though they are out of balance.

Figure 3. The second new card. Now the legend is complete, with the headings interfering between the explanations of the percentage rates, and the figures. The figures are out of position, butted against each other so that they are hard to take in (What is 181.500?) and the two categories of advances do not even agree grammatically.

The system does not provide a place for any entry as a transfer. Currently Master Charge is saying that such a transfer applies — but so far has not quoted the figure transferred, or the basis for the transfer. It could not —

under the system, because there is simply no place for it!

All in all, the new Master Charge design is an even worse example of system designer arrogance than the original one.

It has even more serious professional problems than being a system which is programmed badly. I'll let you look at the output for clues — there are in fact three distinct instances on

the Master Charge bills that may help you find what I am talking about.

And I'm not the only one talking, either. You might read the article on "Credit — The Year Of The Dun" in *Time*, Jan. 25, if you don't see the point at first.

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Figure 4

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 CASH ADS.
 TO 1500 18 1.500
 OVER 09 0.750

Figure 5

PURCHASES
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 OVER 9 0.75%
 CASH ADV.
 TO \$1500 18 1.5%
 OVER 9 0.75%

Figure 6

CULPRIT

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As an output processor, CULPRIT is the first of a new class of software. An output processor handles all the output processing requirements of a new system at computer speeds equal to well-written BAL programs. Output requests are described in the form of parameters analogous to a sort.

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Some of the standard input and output modules supplied with CULPRIT include standard printer paper, special forms, punched card, sequential tape, sequential 2311 disk, sequential 2314 disk, index sequential 2311 disk, and index sequential 2314 disk, and fixed, variable, and undefined record types.

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February 3, 1971

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Random Notes

Distribution Chores Handled by Packages

NEW YORK — Packages covering various distribution operations from driver scheduling to control of automated warehouses are available from D.N. James Co. for use on a Model 25 or larger 360. Other available packages include vehicle scheduling, truck loading, and traffic analysis.

The Cobol packages range in cost from \$3,000 to \$18,000. The firm is at 1220 Broadway.

Tal-Star Systems Aid Newspapers With Composition Software

HIGHTSTOWN, N.J. — Newspaper production managers can use software systems from Tal-Star Computer Systems for composition chores such as hyphenation and column justification.

Built around the General Automation GA-16 minicomputer, the systems can be customized to include classified ad production and text-editing software. Also included is a computer language designed for graphic applications. The firm is at 10 Lake Drive.

Engineering Programs Added To Multicomp T/S Net Library

WELLESLEY, Mass. — Three electronic design engineering programs, Match, Alice, and Micronet, are available over the Multicomp time-sharing network.

Match, a filter analysis program, automatically optimizes circuits; Alice can perform logic simulations from a quick checkout to a detailed analysis of timing problems; and Micronet, a microwave circuit simulation program, shortens design time from days or weeks to hours, according to Multicomp Inc. at 36 Washington St.

National CSS Program Aids Designers of Flat Springs

STAMFORD, Conn. — Design engineers can use the Spring Evaluation Analysis and Design (Spread) program on the National CSS time-sharing network to develop complicated flat springs.

The program allows the user to perform complex stress and force analyses that are said to result in springs less prone to redesign than those designed in the classical manner.

Infonet T/S Simulates Oil Fields

LOS ANGELES — A series of reservoir analysis programs, available on the Computer Sciences Corp. (CSC) Infont time-sharing network, enable oil companies to simulate the behavior of oil fields under varying conditions. Programs for mineral exploration, surveying, design of open pit operations and risk analysis of mining ventures are included.

Lawyers Get Billing Help

VAN NUYS, Calif. — Lawyers in the Los Angeles area can keep accurate accounts of their professional services and expense items with the legal accounting service from Intellectron International Inc.

The service produces client bills, maintains accounts receivable files and produces reports based on input from the user's terminal. The firm is at 7650 Gloria Ave.

Spooler Uses 10K Core, Speeds Work

ATLANTA — Users of Model 25 or larger 360 systems can double the throughput of some background batch jobs, without additional core requirement, by using the Disk Spooling System (DSS) from Continental Systems Associates.

DSS requires 10K of core and can operate in a foreground two partition, to spool all unit record data files to and from disk. The system requires no change in application programs or current operating procedures, according to Continental.

Under full DSS, data can be moved from card reader to disk, or from disk to background as "card" input. Background print or punch output is also moved first to disk, and then from disk to the desired output device.

In addition to simultaneous spooling, DSS allows multi-stacking of jobs on disk so that all computer runs for an application can be completed before the system

shifts to punching and/or printing output.

Unprinted or unpunched data can be recovered from the disk spool file in the event of system or hardware failure, and bad data can be flushed off the disk without printing, the company said.

DSS is similar in concept to a free IBM Type III program product called "Power," which also spools unit record I/O. The IBM package requires 18K of core.

Another spooling package, PowerPak, was developed by Computer General Corp., Washington, D.C., but it requires 131K of core.

DSS is available in three versions for use on 360 models 25 to 50. The full system, requiring 10K, can be purchased for \$6,900 or leased for \$325/mo.

Stripped of the punch handling capabilities, DSS-2 uses 6K core, and costs \$6,500. The printer spooling capability is available by itself, as DSS-3, for \$5,400, and requires 4K of storage.

Continental Systems Associates is at 2075 Roswell Road.

'Midas' Cuts 360 I/O Downtime, Monitors Faulty Data Transfer

WHITE PLAINS, N.Y. — 360 users are being "actively encouraged," by IBM, to use its series of free maintenance routines that check the reliability of data transfers between I/O devices and central processors.

The Modular Isolation, Diagnostic and Analysis System (Midas) was originally developed for IBM's customer engineers, and is now available to users for in-house testing.

With Midas the user should be able to cut the length of service calls and downtime caused by faulty I/O devices, IBM said. The package is available in either tape or disk versions.

Midas monitors all common high-volume I/O devices on 360 models 25, 30, 40 and 50. The package handles tape and disk drives, printers, card readers and punches.

Midas is used to identify the source of data transfer errors so that a user can rearrange his I/O assignments to bypass a faulty unit until a CE arrives. Data from the user's Midas tests can also be used by the CE.

The in-house use of Midas should be most useful for installations that do not have resident customer engineers since these users normally report machine problems to IBM and then wait for service.

The length of time needed to conduct the Midas tests depends upon the peripheral configuration but should be about

three minutes, according to IBM. During the test period, the processor and peripherals are dedicated to Midas and normal processing cannot continue.

Some users who have seen the Midas output, report that it is very difficult to interpret and that this might discourage the use of the routines.

'Decible III' Converts Tables

WEST COLLINGSWOOD, N.J. — Users programming in Cobol, PL/1 or Fortran can increase the efficiency of their coding with the Decible III decision table processor from Independence Computing & Software Corp. (ICSC).

Decible III contains a library system that permits source language programs to be stored on tape or disk. This includes maintenance capabilities that update source programs simultaneously with the decision tables.

The table processor is said to produce optimized coding while running at I/O speed.

With Decible III, the user has an optional ELSE rule. In addition, an initial set rule allows the operation of actions prior to the testing of conditions, and sequenced action entries.

The package has been implemented in three separate versions to produce either Cobol, PL/1, or Fortran source coding from the tables. The system can operate

on a Burroughs B5500, an RCA Spectra 70/35 or a Honeywell 125, in addition to the 360.

It normally requires 49K of memory on the 360, but can function within 32K with overlays. Decible III costs \$9,000 which includes documentation and two days of on-site support.

Independence Computing & Software Corp. is at 235 White Horse Pike.

Telcomp Adds T/S Structural System

CAMBRIDGE, Mass. — Civil engineers can now use the general Structural Analysis System (Strana) in either an interactive or a non-interactive mode, on the Telcomp time-sharing network. It is three-dimensional, handling space frames or structural assemblages composed of elements with two nodes. Telcomp is at 50 Moulton St.

'Fios' Provides File Access, Large Workspace to APL Users

TRENTON, N.J. — APL OS/360 users can access any peripheral device for reading or writing and can work with an unlimited "workspace" with APL-Fios, according to APL General Inc., supplier of the file I/O system.

The same APL extensions are also available to the DOS user with APL-Fidos, the company said.

The workspace in APL is a block of core, conventionally 32K, in which the user has both his program and his data. Although he is able to manually enter a request for another workspace, the new one completely overlays the first so that calculation results cannot be carried from one to the next.

Until now, all workspaces a user planned to access had been stored on one peripheral, normally a disk, and data could not be entered under program control from other devices.

But with APL-Fios, and Fidos, the 32K workspace limitation becomes transparent to the user and he can structure his program as if he had no arbitrary constraints on his file sizes.

The packages are said to access files of any size (segmented into 32K workspace sized blocks) from any device at assembler language speed, even though users are being swapped in and out of core in a time-sharing environment.

The user works with normal APL statements and need not be knowledgeable about I/O problems, a spokesman said.

The APL General package is the first extension of the IBM language to be made available for the OS user, the firm said. APL-Fios and APL-Fidos each lease for \$900/mo.

APL General Inc. is at 433 Latona Ave.

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Retailers Get S/3 Support**IBM Packages Include Interactive Pert**

WHITE PLAINS, N.Y. — IBM has modified two batch-oriented program products and developed a new interactive package to help 360 users solve planning and scheduling problems.

The company also has a program with which System/3 users can get timely information about retail sales operations.

Minipert, the new IBM 360 program enables a planner at a terminal

to map out a project and see how adjustments affect an overall project schedule.

Project Management System IV (PMS IV) is a new version of a program that can help the user coordinate schedules, costs and resources for projects that can include thousands of activities.

More specialized is the Vehicle Scheduling Program Extended (Vspx), an enhanced version of a package that aids fleet owners in determining efficient routes and schedules for their vehicles.

The System/3 retailer package, called Unit Inventory Techniques, generates reports including sales breakdowns on styles, colors, sizes and pricelines.

Two Packages Use Pert

Both Minipert and PMS IV work with the network-line series of tasks arranged by means of Program Evaluation and Review Technique (Pert).

With Minipert, the user enters data about the assignments shown on his Pert network, and receives reports which highlight both slack and tight periods in his project.

Using this information, the planner can adjust his assignments at the terminal to obtain the best schedule.

Highly modular, PMS IV is said to allow Pert users to select just those techniques they need to coordinate projects that vary widely in size and complexity.

The new version of PMS gives the user greater flexibility in describing project activities than earlier versions.

Minipert is expensive in terms of core, requiring 384K under OS or 256K under DOS/360. Written in APL, it will be available in July, under license agreement, at \$150/mo. In addition, it will require the APL program product itself, also under license, at \$275/mo in the DOS version, or \$400/mo in the OS implementation.

PMS IV is scheduled to be available in March. Implemented under OS, it will require 128K of core with the Resource Allocation Processor, or 64K without it. Monthly license charges will be \$50 each for the report, network and cost processors, and \$200 for the resource allocation processor.

The license charge for Vspx DOS is \$100/mo; the OS version costs \$175/mo. OS requires 128K; DOS needs 64K.

The System/3 Unit Inventory package, written in RPG-II, is expected to be ready in July, under license at \$75/mo.

IMI Expands 'Magic' Features to Force Standardized Cobol

SAN FRANCISCO — Cobol users can ease their coding efforts and keep within installation-imposed standards with a pair of preprocessor packages from Information Management Inc. (IMI).

The new packages, Magic-Shorthand and Magic-Standard Enforcer, evolved when IMI split the previously available Magic package and enhanced both halves.

Magic-Shorthand is said to provide the Cobol programmer with unlimited abbreviation capability throughout all Cobol divisions.

The Magic-Standard Enforcer provides an audit check of Cobol coding for level F or full ANS Cobol, the company said. All non-standard uses are automatically flagged or rejected.

The checking can also be used to block language features that are considered undesirable by the user, even though technically available under the compiler in use.

The Magic-Shorthand package now includes a macro facility, syntax checking and output formatting capabilities. IMI supplies some common macros but others can be easily defined by the user, the company said.

Each of the packages requires 64K of core, operates under either OS or DOS/360, and costs \$3,000. Versions are also available for Univac and RCA Spectra users, from 447 Battery St.

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AMPEX

February 3, 1971

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Bits & Pieces**New Bell Dial Card Has More Capacity**

INDIANAPOLIS, Ind. — Bell Laboratories have developed a smaller dialer card, with greater capacity than the one in current use.

Reduce to the proposed Ansi standard credit card size, the new card can accommodate up to 16 characters of data, as opposed to 12 in the older format. Three lines of information can also be embossed on the card.

The higher capacity, Bell said, will allow the expanded use of the dialer cards as a source of input data to a computer. Credit cards could be used to transmit their identification directly to a computer through a dial card terminal.

Communications Systems Added To Syncomp Micro/1 Computer

FULLERTON, Calif. — The Syncomp Data/1, Data/2, and Data/3 systems are a series of data communications systems designed to complement the Syncomp Micro/1 computer [CW, Dec. 16, 1970].

Produced by Synergistic Computer Systems, Inc., the systems vary in core capacity from 4K to 12K bytes. Magnetic tape cassettes and dual-disk drives are included. System prices start at \$17,690, including software, from 2736 W. Orangethorpe Ave.

20% Longer Tapes in Cartridges Will Help MT/ST Productivity

NEW YORK — IBM has introduced a tape cartridge for its MT/ST systems with a capacity of 120 feet, 20% greater than the older cartridge.

The new cartridge has a capacity of 28,800 characters and is said to increase the productivity of the MT/ST by reducing the need to change cartridges. It is priced at \$23.

Typewriter Ribbon Improved

CHICAGO — An improved teletype writer ribbon from Quest Manufacturing Co. is said to be stronger than conventional ribbons with a 50% greater ink supply.

The ribbon is available from 320 S. Franklin St.

Texwipe's Texwand Cleans Disks

HILLSDALE, N.J. — Developed for cleaning disk surfaces, the Texwand from Texwipe Co. produces a metered flow of alcohol through a urethane wick covered by a cloth outer jacket.

Priced at \$75, the unit is made of stainless steel and plastic to prevent corrosion. It is available from P.O. Box 278.

Patches Aid Punched Tape Use

SAN DIEGO, Calif. — "Word Block Patches," by Data-Link are perforated sections of tape punched in a word block of data.

The patches are said to reduce repetitious perforating, and reduce errors. The firm is at 7330 Convoy Court.

Numeridex Has Paper Tape Slicer

CHICAGO — The SC-2 punched paper tape slicer from the In/Opac Division of Numeridex Tape Systems, Inc. offers perfect patch registration, a self-sharpening blade, and a five-year guarantee on parts.

The SC-2 is available at \$75 from 4711 W. North Ave.

System Captures Data

FULLERTON, Calif. — The Beckman Instruments Spectro Data Acquisition System prepares data from spectrophotometers for later computer analysis, from 2500 Harbor Blvd.

Spare Drive Need Called Questionable

By Frank Piasta
CW Staff Writer

The concept of installing a spare disk drive, begun with IBM's original nine-drive 2314 configuration, is becoming less important because of increased equipment reliability.

Most users and disk suppliers surveyed by CW agree that the need for a spare disk is limited to certain sites where equipment downtime cannot be tolerated.

System users still see the need for a spare disk in areas highly sensitive to machine failure. On-line data users would usually have a spare.

IBM some time ago withdrew the original nine-drive 2314 system from its product line, offering in its place a series of modules, with one, two or four drives. These modules enable the user to configure any disk combination up to the

system maximum of nine drives.

IBM refused to comment on whether the spare in the original system was prompted by expected user maintenance problems. But the elimination of the spare drive requirement seems to indicate that IBM no longer considers it a necessity.

Most suppliers of 2314-type disk systems told CW that the spare is not essential.

Univac said it makes no provision for one, while NCR said that its disk reliability was good enough so that a spare is

needed only in very sensitive, real-time applications.

From the user's viewpoint the elimination of the required spare represents a chance to reduce costs. Improved availability of maintenance support also has made the spare drive less important to some users.

Many independent suppliers of 2314-compatible equipment continue to quote nine-drive configuration prices. But users should analyze their specific disk needs before deciding whether a spare disk is worth the added monthly cost.

HIS Mini-Based Concentrators Handle 128 Low-Speed Lines

FRAMINGHAM, Mass. — Two mini-based remote message concentrators from

Honeywell Information Systems (HIS) the H1621 and H1622 are said to reduce communications line costs and central facility loading.

The systems consist of the necessary hardware and software elements to concentrate as many as 64 or 128 low-speed communications lines onto one to four medium-speed data communications lines.

Unattended operation is aided by the inclusion of such features as power fail detect, automatic restart, and downline loading of operational programs triggered by a timer.

The hardware is an assembly of Series 16 options configured to suit the application. The H1621 processor is an H316 with either 8K or 12K of core. The H1622 processor is a DDP-516 with 8K or 12K of core. Capacities of 16K are also available.

All systems are equipped with an MLPC (Multiline Programmed Controller) which multiplexes the serial flow of data and control signals between the processor and 128 switched or dedicated line interfaces. Four user selectable transmission rates are provided with the unit. Low-speed lines can have rates as high as 300 bit/sec, HIS said.

The basic H1621 system rents for under \$1,000/mo, and the H1622 rents from \$1,600/mo.

Philips CPUs Get Peripherals

NEW YORK — Philips Business Systems has added four peripherals to its P-350 business minis, transforming the journal-card oriented accounting system into a small-scale general-purpose computer.

The P-350 Series office computers includes three basic systems — P-351, P-352 and P-353 — with pre-programmed software packages. All systems utilize core memory for data and program storage and are said to employ fourth generation microprogramming techniques.

The peripherals, including a card reader and punch, and a paper-tape reader and punch, can be included in the 16 I/O devices the system can support.

The P-110 punch card handles 80-column cards at 50 column/sec. A push-button release for corrections interacts when the system's card stacker is empty, the hopper is filled or the card transport is empty. The stacker and hopper each hold 500 cards. The price of the P-110 is \$4,790.

Both Read and Punch

The card reader, called the P-115, can handle numeric or alphanumeric data at

speeds to 280 card/min. The reader and punch can be operated simultaneously so that cards can be read, entries added by keyboard operation, new balances calculated and fresh cards punched. Data from the reader is transmitted to a 160-character memory buffer. The price of the card reader is \$4,390.

On-Line Tape Punch

The P-120 paper tape punch is an on-line unit that punches standard 5-8 channel tape at a rate of 50 char/sec with parity checking.

Word length is variable for alphanumeric data and variable up to a maximum of 15 digits plus sign for numeric data. Block length is variable to a maximum of 128 characters. The P-120 costs \$3,990.

Paralleling the operation of the paper tape punch, the P-125 paper tape reader photoelectrically reads any standard tape code — BCD, Ascii, and 5-channel teletypewriter output. It is priced at \$4,290.

Philips Business Systems is a subsidiary of North American Philips, at 100 E. 42 St.

Four Real-Time Controllers Turn GRI-909 Into Series

NEWTON, Mass. — GRI Computer Corp. has expanded its 16-bit GRI-909 process control computer into a series.

The models 10, 20, 30, and 40 feature the universal bus concept announced with the GRI-909 in which all peripherals, memory and internal computer elements share common buses.

The Model 10 is designed for applications that require no operator interaction, being equipped with a blank console with a key-lock power switch.

The Model 20 is similar to the Model 10, with the addition of a conventional operator's console.

The Model 30 offers a 4K word memory that is expandable to 32K in increments of 4K.

The Model 40 includes hardware multiply/divide, double-precision N-bit shift/divide, eight general-purpose registers and floating-point firmware.

The base price of the Model 10 is \$3,500; the Model 20, \$3,950; the Model 30, \$5,950; and the Model 40, \$7,790. All models are available 30 to 60 days from 320 Needham St.

Marshall Cuts Prices on Disk Drives

SAN MARINO, Calif. — Marshall Industries has repriced its IBM-compatible disk drives so that effectively they are up to 15% below the comparable IBM prices.

Under the repricing, Marshall has pushed the lease price of the controller up slightly, from \$1,300/mo to \$1,340/mo. At the same time, however, the price per spindle has been cut, from \$430/mo to \$305/mo, a drop of nearly 30%.

The firm is at 2065 Huntington Drive.

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BAI Proposes Transmission Standards

PARK RIDGE, Ill. — Data transmission compression standards proposed for use by banks may have application in other fields as well.

The proposed standards, intended to smooth existing and future batch-mode interbank data communications, have been included in a report published by the Bank Administration Institute (BAI). Whenever possible, the proposals coincide with similar ideas under study by the American National Standard Institute (Ansi), BAI said.

But parts of the proposal are peculiar to banking and these will probably be considered only by the American Banking Association, a BAI spokesman said.

The proposal sets up a batch transmission standard format for banks, including such elements

as addresses; message content and format; standard records in multmessage transmissions; and field and code definitions.

The proposal resulted from a joint effort between BAI and

several other groups, including the Federal Reserve, Bank Wire, Interbank Card Association, National BankAmericard, Inc., Special Committee on Paperless Entries (Scope), and Tele-Net.

BAI said it would welcome comments on the proposal, titled "Communications Standards for Banks" and available from 303 S. Northeast Highway, at \$8/copy.

'Tel-Con' Analyzes Telephone Traffic

WILMINGTON, Del. — Data users with extensive telephone toll traffic can analyze the routing, volume and cost of calls with Tel-Con I, available as a package for in-house use or as a service from International Telecontrol Corp. (ITC).

The Tel-Con package accepts as input cards keypunched from toll bills, "large user tapes" or record cards from local telephone companies. It produces, at the user's option, a Wats band

analysis; a list of calls by area code; or a report showing daily

list helps to define often-called geographic regions, ITC said.

The daily distribution report shows calls by hour of day, holding time and average call length.

Tel-Con can run on any IBM 16K 360 under either DOS or OS and is available for \$800. As a service, the Wats band analysis can be produced for approximately 2 cent/call, the company said. International Telecontrol Corp. is at 4300 Pine St.

Communications

call distribution.

The Wats band analysis can be used to determine need for a Wats line, while the area code

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Canadian Government Pressed for Carrier EDP Service Policy

DON MILLS, Ontario — An expansion of time-shared computer services by Computer Sciences Canada Ltd. has again accentuated the need for policy from the Canadian Government. At issue is whether Canadian common carriers should be allowed to offer data processing services.

The Canadian Government's Telecommunication last spring produced a tentative report, outlining several policy possibilities, most of which would allow the common carriers to offer EDP services. A special task force has been commissioned to produce a statement of policy, which is expected to be ready next fall.

CSC Ltd. is 49% owned by Computer Sciences Corp. of Los Angeles and the other 51% is owned equally by Canadian National and Canadian Pacific railways, both of which are communications common carriers.

For some time CSC Ltd. has provided remote job entry capabilities through a Univac 1108 in Calgary. Last spring the company opened a new computer center in Toronto to provide local dial-up service nationwide.

Now CSC Ltd. has added conversational capabilities to its western operations, providing Basic language facilities for users. In addition, Infonet time-sharing application programs have been made available to Canadian users.

Paradyne Modem Provides Error-Free Transmission

CLEARWATER, Fla. — A modem that is said to provide error-free transmission at 4,800 bit/sec over dial-up lines has been developed by the Paradyne Corp.

The Marq-48 contains a complete error-control system, the ARQ, which employs optimum cyclic redundancy error detection codes.

An adaptive equalizer, controlled by a special-purpose computer, increases the system's reliability by dynamically equalizing the modem to line conditions. This eliminates the need for conditioned lines, the company said.

The modem provides continuous error control by using a reverse channel to bring back "ack-nack" signals in parallel with continuous data transmission.

An interval memory system in the modem can store several blocks of data for possible retransmission in case of error.

The data in the modem is bit-synchronous and block-synchronous; allowing the unit to be used as a source of parallel data to a computer channel.

The Marq-48 is priced at \$5,950 from the firm at Clearwater Industrial Park.

DPMA Shortens Seminars to One Hour

CW Midwest Bureau

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) has announced a major change in its seminars at the association's 20th annual International Data Processing Conference and Business Exposition in Houston, Texas, June 22-25.

DPMA said that the technical seminars program at the conference is being modified to allow the registrants more opportunity to participate in more seminars.

Previously, DPMA said, the seminars ran two and one half hours. This year, the seminars will be scheduled for one hour

and offered in a series of two half-day sessions covering compatible topics.

The "open selection," general interest seminars, will be offered as in past years, but in the shortened format. DPMA said that a number of the more popular general and technical seminars of this year's sessions would be repeated during the conference so that conflicting schedules or other reasons causing a registrant to miss a session would be avoided.

This year's seminars, DPMA said, will focus on "Current and

Future Developments in EDP Equipment and Software, Operational and Management Techniques, Systems Analysis, Standardization, and Other Timely Topics of Interest to the DP Professional."

A special seminar for corporate officials — an executive briefing on the control of computers — will be given by a management consulting firm.

According to DPMA, the business exposition will have revised hours over previous conferences, again to allow for more participation in seminars.



COMPUTERWORLD

societies/user groups

IEEE Cuts Jobless Member Dues

NEW YORK — The board of directors of the Institute of Electrical and Electronics Engineers (IEEE) has authorized the reduction, by 50%, of all dues and fees for those members of the institute currently unemployed.

IEEE members, who are currently unemployed through involuntary termination and are

actively seeking re-employment, may continue their IEEE membership through December 1971.

To take advantage of this arrangement, a signed statement must be submitted to IEEE headquarters indicating that the member is involuntarily unemployed and seeking re-employment.

Conditioning Method Trains Key-punchers

ENGLEWOOD CLIFFS, N.J. — Just a little more than a year ago, Automated Instruction Inc. introduced a learning concept to enhance present-day training methodology in type-writer keyboard skills.

Through the application of repetitive visual and auditory stimuli, reinforced by student motor response, the time spent in learning the keyboard was re-

Education

duced to four hours, with entry-level speeds achieved in just 20 hours of instruction.

The same student memory and motor conditioning process is now used in the company's keypunch course to introduce the pupil to the operation of the IBM 029, 026 and 024 Card Punch machines.

The system rapidly develops a total memory and finger response on the numeric keys, the alphanumeric keyboard and the function keys. Conditioning exercises provide finger dexterity and accuracy and bring the pupil to speeds up to 18,000 stroke/hr.

Because the keypunch operation is considerably more complex than touch typing, step-by-step illustration takes the student along each of the functions of the machine, first by demonstration, then together with pupil participation. The program utilizes ten 20-minute sound color motion picture cartridges and a simple, heavy-duty optical projection system.

Sociology Students Welcome DP Course

MADISON, Wis. — As research in the social sciences becomes more complex, computer usage for analysis is becoming increasingly common. Realizing this, the University of Wisconsin here is offering sociology graduate students a non-credit course in data handling techniques.

"We are offering the course," said instructor Richard Campbell, "because there are many statistical problems with our research that can only be done by computer."

The in-coming graduate students, Campbell said, may learn the basics of using computers to help with the problems in statistical analysis.



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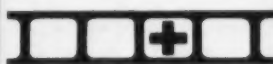
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February 3, 1971

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CI Notes

Lessors Mull 360 Upgrade

NEW YORK — Computer lessors are trying to find ways to get their customers to upgrade their present 360 systems instead of turning to the new IBM 370 series, which the lessors claim is unrentable [CW, Jan. 20].

To aid in this project, the Computer Lessors Association, which represents 65% of the independent lessors' investment in 360s, has retained Compata, Inc., Los Angeles, to investigate possible system enhancements to various models of the 360 line.

The study could show others in the industry what users want in their systems and what they are willing to pay.

Cogar Sees Deliveries Increasing

HERKIMER, N.Y. — Cogar Corp. stockholders have been told that the firm is conducting negotiations with major computer manufacturers that "will result in high-volume deliveries of Cogar Monolithic Memory Systems in late 1971 and throughout 1972."

The firm reiterated its prediction of \$40 million in memory sales in 1972 and promised significant investments in end-user marketing.

Cogar said that deliveries of its new System 4 will begin in March at the rate of 50 a month and will be expanded to 500 a month by the end of 1971.

Banks Can Sell Excess DP Time

WASHINGTON, D.C. — Sometimes it just seems that you can't win, or at least that's what the service bureau industry might be thinking now.

When the One-Bank Holding Company Bill was passed recently, the industry assumed that the Board of the Federal Reserve system would keep banks out of the DP services area. But not so.

The board last week said that a bank holding company could apply to get an interest in a company that provides DP services as long as most of the business of the subsidiary was with the bank.

Supershorts

Burroughs Corporation has received a \$469,000 research and development contract from the U.S. Air Force for the development of an advanced aerospace multiprocessing computer to be used in future high-performance aircraft and space vehicles.

Logic Corp. has announced a record sales order backlog with orders to be shipped exceeding \$2 million in value, which will produce revenues in excess of \$1.4 million.

The ADP Procurement Division of GSA recently informed Versatec that the company's complete line of non-impact, electrostatic printers, plotters, and combination printer/plotters has been accepted for the Federal Supply Schedule.

Raytheon has formed a new subsidiary to consolidate its activities in data processing and communications. Known as Raytheon Data Systems Co. (RDS), it is headquartered in Norwood, Mass.

News Analysis

370 Pricing Protects IBM Rental Base

By E. Drake Lundell Jr.
CW Computer Industry Editor

WHITE PLAINS, N.Y. — IBM's pricing of the System 370 is clearly aimed at penetrating the second largest mainframe replacement market — IBM users that do not rent directly from IBM.

At the same time the pricing is designed to keep the majority of 360 users that rent directly from IBM firmly in the fold — and keep them using their 360s for a few more years.

And that's one reason that there won't be a 370/135 very soon, even though most industry sources say that it is waiting in the wings in Armonk for introduction.

When the first units in the 370 family were announced, aimed at replacing 360s, IBM didn't want to move too fast, since many of the 360 computers hadn't been on lease long enough for the rentals to equal the purchase price.

Therefore, if all 360 users replaced their machines with 370s, IBM stood to lose money.

Potential Market

But there was, luckily for IBM, one whole group of 360 users that did not rent directly from IBM — the 40% of the IBM users that either take their equipment on a direct purchase basis or from the third-party leasing companies.

For example, 57% of the 360/50s are rented from IBM, 27% are leased from leasing concerns, and 16% are owned outright. For the 360/65 the percentages are 44%, 27%, and 29% respectively, and for the 360/40 they are 58%, 25%, and 17%.

At the same time, almost 80% to 85% of the 360/30s are rented directly from IBM.

These figures show the impact on IBM will be less if large computer users (360/40s, 50s, and 65s) upgrade, than if the smaller users (360/30s) did. But the pricing schedules for the new machines are even more advantageous to the firm.

The object of this pricing policy is revealed by a comparison of 360/50 prices with those of the 370/155, which has been touted as its replacement.

The 370/155 is said to offer 145% of the performance of a 360/50 when both have 256K of main memory, according to figures developed for Intel Corp. by independent consultants and confirmed by other industry sources. At the same time the 370/155 is priced at 132% of the cost of the 360/50.

For 32% more in price, a user can get 45% better performance — hardly a startling improvement in the price/performance ratio, and in fact such a small gain that most users would not be interested in undergoing the conversion on a rush

basis for the slight performance increase.

At the upper end of the scale, 360/50s with 512K of main memory, the user can upgrade to the 370/155 and get a 60% increase in performance — with only a 6% increase in his costs!

At present the 512K machines account for around 28% of the 360/50s installed and IBM has about 50% of those on direct rent.

On the other hand, 256K 360/50s account for over 50% of the units installed, again with about half of those rented directly from IBM.

So out of all the 360/50s installed, IBM has about 25% in the 256K range and about 14% in the 512K range. The impact on IBM of 512K users upgrading is therefore a great deal less than it would be if the 256K users upgraded.

At the same time, most of the 360s with smaller core sizes (under 256K) are rented directly from IBM and the price/performance ratios are also not very favorable for upgrading in this area.

By its prices for the new series of machines, IBM has been able to offer greatly increased capacity to the large 360/50 user — and at the same time experience little revenue erosion.

The people caught in the middle are the third-party lessor and, more importantly, the user who purchased his equipment.

Leasing Firms Eye Expansion

This is the third article in a series on the leasing companies and their future. The second article appeared last week and analyzed the IBM pricing moves that are forcing the lessors out of the computer field.

The recent acquisition of Information Storage Systems by Intel [CW, Jan. 20] clearly blazes the trail that will be followed by the major third-party leasing companies — expansion into new territory.

Data Processing Financial and General (DPF) plans to limit its expansion in the foreseeable future to other "high-ticket" leasing ventures as opposed to new ventures strictly within the computer industry, according to President Ryal Poppa. DPF has been burned in the past, under its old management, by ventures into the service bureau field and into computer manufacturing, Poppa indicated. The service bureau venture, he said, was particularly ill-managed.

Intel, which has already diversified into other leasing areas, plans to expand in the direction indicated by the ISS takeover.

According to Peter Redfield, Intel president, acquisition of firms producing computer equipment is a natural move, since Intel has the available cash, a large capital structure to support rental programs, and a large sales staff.

While these moves are definitely in the works — with a lot of acquisition and expansion activity scheduled for the next year — the lessors are also learning the lessons of the past, such as Leasco's unlucky and costly bid for Permagon Press and the Nevada operations of Levin-Townsend.

Future expansion will definitely be better controlled and managed, or at least that's what all the lessors are hoping.

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Our March 31st Memories Supplement

will feature:

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 - The trend to disks.
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Our April 28th Outputs Supplement

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 - Printers – impact vs. non-impact, speed vs. copies.
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Projects Threatened

Government Cuts in R&D Aid Increase Industry Role

By Phyllis Huggins

CW West Coast Bureau

LOS ANGELES — With unemployment and public dissatisfaction with unsolved civilian problems rising, research and development has become a target budget cut for government departments and Congress. Adding to this situation is a general wariness by the administrative branch of government and Congress toward the academic and intellectual community.

A little disenchantment with science is healthy but the trend of the past few years has been almost punitive and is seriously crippling projects that require the nurturing of public funds.

Ivan Berenyi, a British computer specialist, reported recently that Russia is five to 15 years behind the U.S. in computer technology. This has been confirmed by visiting Russian scientists.

To fall behind in this technology now could mean losing ground on all technical and social fronts.

In the past, the Department of Defense has been the prime provider of R&D for the computer community, and while there have been great benefits from this support, the community has restlessly wished that there were more support from other agencies such as the Department of Health, Education and Welfare.

With defense funds drastically reduced, research groups are looking harder for other sources and find good intentions

but scarce money.

Lobbying a Factor

It is also undoubtedly true that older sciences, with more experience in Wash-

Viewpoint

ington political go-round lobbying, will fare better than this community in its share of what's available.

The reduction in government support of research was reported by Battelle Memorial Institute in its annual study of research and development funding. For 1971 it forecasts that research and development spending in the U.S. will reach \$28.5 billion, a rise of 3.6% over 1970, and this does not even cover inflationary cost increases.

Further, this modest increase will come entirely from industry, academic institutions and other not-for-profit institutions. Federal support will decline by about 1.2%. On the basis of estimates, the real R&D effort is expected to fall 2.3%.

These figures compare poorly with the R&D rate for 1965-66, for example, when funds grew by 9%.

IBM's Role

The cutback in support of computer technology is undoubtedly of a greater percentage than these figures reveal due to its dependency upon defense. This puts increased weight upon the money spent by the industry's main source of profits, IBM.

IBM this past year spent 5% to 6% of its gross income on R&D for an amount of roughly \$37 million.

The Battelle report states that government spending will be the source of about 52% of all R&D funds spent in 1971 — a decline of 2.6%. Industry is expected to provide about 42.4%, an increase of 2.3 percentage points. Academic institutions take up 3.7% while other not-for-profit sources account for 1.5%.

Of interest is Battelle's findings that industry is performing increasing amounts of research although the federal government is still the prime source of funds. For 1970 industry performed 70% of all research and in 1971 it will perform 72%.

Passing the buck, literally, to industry is something for the computer community to ponder. With industry providing more of the money and doing more work, is our technology to become more removed from society and further congealed into industrialization?

Chapter 10 Governs Farrington Operation

SPRINGFIELD, Va. — Farrington Manufacturing Co., the troubled OCR manufacturing pioneer, is now operating under Chapter 10 of the Federal Bankruptcy Act.

The company filed a voluntary petition seeking reorganization. In a brief announcement, the firm said that the step was taken after discussions with counsel for its long-term debt holders including counsel for New England Merchants National Bank of Boston, which, as trustee for Farrington debenture holders, had filed an involuntary petition in Chapter 10 against the manufacturer last December [CW, Dec. 30 — Jan. 6].

The bank said Farrington had defaulted on \$3.77 million in 5-1/2% subordinated notes last April 1 and interest payments Oct. 1 on \$12.5 million in 6% convertible subordinated notes and on Nov. 1 on interest due on \$9.97 million of 5-1/2% convertible debentures.

The previous petition, which had not yet been allowed by the court, was withdrawn in light of Farrington's voluntary filing.

One of the effects of the filing will be to permit an appearance to be made in the reorganization proceedings on behalf of the holders of Farrington common stock.

EMR Increases Efforts In Law Enforcement Area

MINNEAPOLIS — EMR Computer is increasing marketing efforts in the law enforcement area, and reports installation of its 6130 message switcher in Oregon.

This is the second installation in the police area, with disk controllers already in operation in Florida.

The 6130 interfaces with the FBI's computers in Washington, D.C., and the IBM 360/40 at Oregon's Department of Motor Vehicles, as well as the Lane County Area Information Record System (Airs), which also uses a 360/40.

EMR said Washington would also be installing 6130s as elements of that state's law enforcement system.

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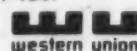
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Four Appointed in Burroughs Management Expansion

DETROIT — Burroughs Corp. has announced a number of executive appointments in a program of management development and expansion.

Charles E. Exley Jr. has been appointed vice-president, finance, and will be responsible for financial operations under

Executive Corner

the direction of Harry G. Bowles, senior vice-president, finance, who will retire on March 1. Upon the retirement of Bowles, Exley will become the chief financial officer.

Richard O. Baily has been named vice-president and group executive, business forms and supplies group.

James A. McCullough, currently vice-president, product management and a director, has been appointed vice-president and group executive, business machines group.

Stan Jones, currently director of computer systems on the corporate product management staff, has been named director of product management.

Other Moves

Comcet, Inc., St. Paul, Minn.,

has appointed John R. Meshinsky vice-president of sales.

Dr. Donald O. Knight has been appointed vice-president for corporate planning of Western Data Sciences, Inc., Phoenix, Ariz.

B.F. Powers has been promoted to vice-president, marketing and marketing support of University Computing Co.'s Government Systems Division of Dallas.

John W. Luke has been named president of Information Network Division of Computer Sciences Corp., Los Angeles.

Charles H. Comfort, II, has been appointed vice-president of Communications Systems Division at Computer Complex, Inc. of Houston, Texas.

Geoffrey R. Cross has been promoted to vice-president of the Univac Northern European Division headquartered in London.

California Computer Products, Inc., Anaheim, Calif., has named LeRoy E. Amendt vice-president in charge of product service.

Data Processing Security, Inc., Hinsdale, Ill., has elected

Paul E. Zahn vice-president of operations.

Synergistic Products, Inc. of Santa Ana, Calif., has appointed Barrett N. Brown vice-president.

William T. Allott has been named president of CPI-Telecommunications, Inc. of Austin, Texas.

Norman Avrech has been appointed vice-president and general manager of Systems Division of Proprietary Software Systems, Inc., Los Angeles.

Computer Copies Corp. of

New York has named Louis R. Greer executive vice-president and chief operating officer.

Boothe Resources International of Los Angeles has appointed John K. Silberman vice-president, professional services.

Data Products Corp., Los Angeles, has promoted Howard B. Rose and Richard H. Ericson to vice-presidents in its Line Printer Division.

Derek G. Price has been appointed president of Com-Share (Canada) Limited, Rexdale, Ontario.

Contracts

Computer Consoles, Inc., Rochester, N.Y., has signed a three-year contract with American Telephone and Telegraph Co. to supply systems to automate circuit order preparation, circuit layout, and provide automatic electronic storage and retrieval capability for the Long Lines Department in eight major cities.

The Central and Southern Florida Flood Control District has awarded a contract to General Dynamics' Electro Dynamic Division in Orlando, Fla., to analyze application of communications systems and computers for water control purposes.

Systems & Computer Technology Corp., West Chester, Pa., has received a contract from the C.W. Post Center of Long Island University for a college-wide study of administrative DP needs.

The Data Communication Products Division of Ultronic Systems Corp., Mt. Laurel, N.J., has landed a \$125,000 contract from Datafile Systems Corp., Latham, N.Y., for 200 Ultronic data pump 1200 modems.

The Electronic Systems Division of Bunker-Ramo Corp., Westlake Village, Calif., has won a \$372,000 contract from the Air Force Electronic Systems Division, L.G. Hanscom Field, Bedford, Mass., to install and maintain BR-700 information systems at three Air Force bases.

Astrosystems, Inc., Lake Success, N.Y., has received a contract in excess of \$2.4 million from PRD Electronics Inc. for 15 each of three types of automatic test equipment for use in the Navy "Vast" program.

Shareholders Management Co., Century City, Calif., has awarded a contract to CTC Computer Corp., Palo Alto, Calif., to provide computer systems programming and data preparation services for a minimum of one year.

Technology Inc. of Dayton, Ohio has received a \$176,000 contract from Tinker AFB, Okla., to furnish 44 tape-to-tape transcribers for use in translating aircraft performance data gathered on in-flight tape magazines to computer-compatible form.

POSITION ANNOUNCEMENTS POSITION ANNOUNCEMENTS

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A vacancy exists for a senior systems programmer to take charge of the team of persons responsible for maintaining and optimising the performance of the operating system (IBM O.S. MVT Release 19). Previous experience of the IBM O.S. operating system is essential and experience in supervising staff would be a recommendation.

The commencing salary will be by negotiation and will depend on previous experience. Applications in writing, giving full personal particulars and details of qualifications and experience, should be lodged with the Registrar, University of the Witwatersrand, Jan Smuts Avenue, Johannesburg, by not later than 15th February 1971.

HOW do things look for the computer industry as the pause in growth apparently is ending?

The current "Gray Sheet" -- a Midyear Review -- examines the status of each major mainframe supplier and all industry segments. Send for the current issue -- \$8. Or, go ahead. A year's supply only costs \$75.

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Nickels and Dimes

Clancy Spangle, head of Honeywell Information Systems — who began his career with Honeywell selling thermostats — has been promoted to executive vice-president, succeeding Charles Davis, who becomes the president of Addressograph-Multigraph as of Feb. 1. Spangle now reports directly to President Stephen F. Keating. Davis's departure was amicable, and Chairman James Binger said "we understand his natural desire to be chief executive officer of a major firm." Both Binger and Keating are in their early fifties, far away from retirement age.

\$\$\$

University Computing has sold its Market Research Division to Survey Research Sciences of Dallas. The sale includes proprietary software developed by UCC for research analysis.

\$\$\$

While the quarter ending Oct. 31 showed a slight improvement in profit (from \$21,729 to \$24,273 on a sales increase from \$706,914 to \$1.2 million), National Computer Systems is still laboring under an unprofitable first half, so that the nine-month figures show a net loss of \$122,540 compared to a small profit for the year earlier. Sales increased about 50%, from \$2 million to \$2.9 million. The service bureau, which specializes in educational test scoring as well as source data products, says that it has "reduced operating costs in several significant areas."

\$\$\$

J.C. Penney, speaking of nickels and dimes, has ordered the first Hewlett-Packard 2000B time-sharing system dedicated entirely to business applications. Though the choice was between the mini and outside T/S services, the entry of the minicomputer makers into the general-purpose business market is an interesting phenomenon, one IBM has been watching carefully.

\$\$\$

Magnetic Head Corp. has closed an agreement with a California firm that may bring a total of \$15 million to \$25 million in new capital to the disk head maker. Santa Anita Consolidated will initially invest \$1.2 million in MHC in debt-equity package by September, Santa Anita also has a call option on up to 51% of MHC's common.

\$\$\$

Cyberdynamics, a San Francisco management consulting firm, has acquired Interactive Sciences Corp., a Boston time-sharing company. The goal is to provide a time-sharing service "with emphasis on solving business problems." Systems are currently available in the areas of management services, advertising analysis, communication optimization, business-oriented data bases, and statistical programs.

Earnings Up 21% in Burroughs Record Year

DETROIT — A rotten year it may have been, but at Burroughs it is hard to get really worked up about it. For the year sales rose 18% and earnings 21%.

The record year showed net earnings of \$66.5 million, up from \$55.2 million, which boils down to \$3.83 per share, up from \$3.32 a share. Worldwide revenue rose from \$759.3 million to \$893.4 million.

Burroughs revenue growth came from both overseas and U.S. operations. Revenue from

international operations increased 36%. The U.S. Business Machines Group, largest of the domestic groups, increased revenue 14%.

Financial

Electronic data processing products revenue increased 36% while revenue from equipment rentals increased 27%.

Accounting machines, commercial minicomputers and small

application machines revenue increased 9% for the year.

Fourth quarter net earnings in 1970 were \$29.7 million, a 19% increase over 1969 fourth quarter earnings of \$25 million. Earnings per share for the 1970 fourth quarter were \$1.69, compared with \$1.49 per share in the 1969 fourth quarter.

Fourth quarter revenue was \$273.8 million, an increase of 13% over last year's fourth quarter revenue of \$242.1 million.

Worldwide incoming orders for commercial standard products in 1970 were 7% higher than in 1969. Government contract custom product orders during 1970 declined 37%. Combined commercial standard and government incoming orders in 1970 were 3% higher than in 1969.

Orders for commercial standard EDP products registered a 7% increase for 1970 over the record high level established in 1969. Orders for accounting machines, commercial minicomputers and small application machines also continued at high levels during 1970, exceeding 1969 by 7%.

Worldwide backlogs at year-end 1970 declined 9% below the record high level backlog position established in 1969.

DPF 1st Half Net Drops to \$2.7 Million

HARTSDALE, N.Y. — Data Processing Financial & General Corp. (DPF) has reported net income from continuing operations of \$3.2 million or 79 cents per common share, on revenues of \$24.9 million for the six months ended Nov. 30.

After deducting a loss from discontinued Systems Division operations amounting to \$131,500, or 3 cents per share and previously indicated extraordinary charges totalling \$396,000, or 10 cents per share, net income amounted to \$2.7 million, or 66 cents per common share.

For the first half a year ago, the company reported net income of \$4 million, or \$1.14 per common share, on sales of \$24.6 million. These figures reflected a loss from discontinued Systems Division operations of \$1 million, or 30 cents per share.

For the fiscal year ended May 31, the company reported a net loss of \$4.3 million, equal to \$1.14 per common share, on \$49.4 million in revenues.

Net income from continuing operations during the second fiscal quarter were within one cent per common share of earnings reported for the first quarter. The second period earnings provide for a loss from discontinued operations amounting to

\$141,500 after tax effect, reflecting an additional provision for uncollectable receivables of the Systems Division, whose operations were discontinued during last fiscal year.

As indicated at DPF's last annual meeting, an additional extraordinary net item of \$396,000 was charged against operations for losses on investment in affiliates less the recovery on the settlement with IBM.

The current six months' income from continuing operations reflects an increase in depreciation charges, amounting to \$600,000, equal to 15 cents per common share resulting from a change in depreciation policy effective June 1, 1970, and a higher deferred income tax rate.

The reduction of available investment tax credits during the current period accounted for the increase in deferred income tax rates.

Since May 31, 1970, the company's obligations to banks and secured creditors have been reduced by \$15.6 million while its cash position has improved.

DPF President Ryal R. Poppa said he was pleased that the company made strides in the first half in improving its marketing and administrative capabilities and that solid efforts

were under way leading to future expansion into other forms of leasing and into selected financial services.

Graham Magnetics Shows Highs In Revenues, Net Income, Backlog

GRAHAM, Texas — Tape-making Graham Magnetics has turned in a record six-month report, boasting new highs in revenues, net and backlog.

Sales increased more than 65% while net soared 251% over the corresponding period last year. In the six months ended Dec. 31, sales reached \$3.9 million compared to \$2.3 million in the same period last year.

Net income rose to \$477,642 from \$135,947 a year ago. Net income per share was 71.5 cents, compared to 10.2 cents per share in the same six months last year.

"It is particularly pleasing," Graham President George A. Jagers said, "to accomplish these gains during a period when the general economy has been declining. We attribute this to customer acceptance of a theme we have stressed since our beginning — quality of product."

Jagers said the company also has made significant gains in productivity and product yield. He also praised the work of the

company's research and development section.

"We have several developments in process at this time," Jagers said, "that make us more optimistic about the future of Graham Magnetics than at any time in the past."

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Intel Annual Earnings Rise 16.3%, Quarter Reveals Income Up 58.5%

SAN FRANCISCO — Intel Corp. has reported record revenue and income for the fourth quarter and the year ending Dec. 31. The company reported a 41.7% increase in primary earnings per share of 34 cents, compared with 24 cents for the year earlier period. Net income for the quarter rose 58.5% to \$1.5 million from \$919,000 on revenues of \$20.5 million as compared to \$11.9 million for the fourth quarter of last year.

Intel President Peter S. Redfield also reported a 16.3% increase in primary earnings per share for

the year ending Dec. 31. Primary earnings per share increased to \$1 as compared with 86 cents a year ago. Net income rose 29.6% to \$4.3 million as compared with \$3.3 million on revenues of \$67.4 million against \$40.4 million for the year earlier period, a 66.6% increase in revenues.

Redfield, speaking at the company's San Francisco headquarters, noted that the gains were "particularly gratifying because of the fact that the upward trend in over all earnings reflected positive results achieved in all divisions of the company."

C&S Reports 'Record Performance'

LOS ANGELES — Computing and Software, Inc. (C&S) for the fifth consecutive year has reported record high annual sales and earnings.

For the year ending Oct. 31, earnings per share reached a new high of \$1.18, a 30% increase over the 91 cents in the prior year.

Net income advanced to \$6.3 million compared with \$4.7 mil-

lion recorded for fiscal 1969. Sales for fiscal 1970 rose to \$89.5 million from \$79.2 million in fiscal 1969. All prior year's figures have been restated to reflect acquisitions made on a pooling-of-interests basis.

"We attribute our record performance to focusing our efforts upon the business information market," indicated Norman E. Friedmann, C&S chairman and president.

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY



Computerworld Stock Trading Summary

All statistics
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CLOSING PRICES THURSDAY, JANUARY 28, 1971

| E X C H | | -----PRICE----- | | | | E X C H | | -----PRICE----- | | | |
|--------------------------|----------------------|-------------------------|-------------------------|----------------------|----------------------|--|----------------------|-------------------------|-------------------------|----------------------|----------------------|
| | | 1970-71 RANGE (1) | CLOSE JAN 28 1971 | WEEK NET CHNGE | WEEK PCT CHNGE | | | 1970-71 RANGE (1) | CLOSE JAN 28 1971 | WEEK NET CHNGE | WEEK PCT CHNGE |
| SOFTWARE & EDP SERVICES | | | | | | | | | | | |
| O | ADVANCED COMP TECH | 1- 6 | 2 | 0 | 0.0 | O | STANDARD REGISTER | 17- 30 | 21 | - 1/2 | -2.3 |
| A | APPLIED DATA RES. | 4- 24 | 7 1/8 | +2 1/8 | +42.5 | O | TAB PRODUCTS CO | 4- 12 | 8 7/8 | + 1/2 | +5.9 |
| O | APPLIED LOGIC | 1- 18 | 1 1/2 | 0 | 0.0 | N | UARCO | 22- 39 | 27 1/4 | + 1/2 | +1.8 |
| O | ARIES | 1- 8 | 1 3/4 | - 3/8 | -17.6 | A | WABASH MAGNETICS | 7- 30 | 9 | +1 | +12.5 |
| N | AUTOMATIC DATA PROC | 23- 48 | 46 1/2 | - 1/2 | -1.0 | O | WALLACE BUS FORMS | 17- 41 | 20 3/4 | +1 | +5.0 |
| O | AUTO SCIENCES | 3- 14 | 5 1/8 | + 3/8 | +7.8 | COMPUTER SYSTEMS | | | | | |
| O | BRANDON APPLIED SYS | 1- 10 | 3/4 | - 1/8 | -14.2 | N | BURROUGHS CORP | 78-173 | 114 1/4 | +3 1/4 | +2.9 |
| O | COMPUTER AGE INDUS. | 1- 3 | 3/4 | - 1/4 | -25.0 | N | COLLINS RADIO | 9- 37 | 17 1/8 | +2 | +13.2 |
| O | COMPUTER ENVIRON | 1- 15 | 7/8 | - 1/8 | -12.5 | N | CONTROL DATA CORP | 30-122 | 58 1/4 | +5 3/8 | +10.1 |
| O | COMPUTER INDUS. | 2- 24 | 5 | + 1/2 | +11.1 | O | DATA GENERAL CORP | 16- 59 | 22 | +1 3/8 | +6.6 |
| O | COMPUTER NETWORK | 2- 14 | 3 5/8 | + 1/8 | +3.5 | N | DIGITAL EQUIPMENT | 50-124 | 62 3/4 | +3 1/4 | +5.4 |
| O | COMPUTER PROPERTY | 4- 15 | 7 1/4 | - 1/2 | -6.4 | N | ELECTRONIC ASSOC. | 3- 11 | 5 3/4 | + 1/8 | +2.2 |
| N | COMPUTER SCIENCES | 6- 34 | 11 1/8 | 0 | 0.0 | A | ELECTRONIC ENGINEER. | 3- 14 | 5 7/8 | + 1/8 | +2.1 |
| O | COMPUTER TASK GROUP | 1- 4 | 1 1/4 | 0 | 0.0 | N | FOXBORO | 18- 39 | 33 1/2 | +1 5/8 | +5.0 |
| O | COMPUTER USAGE | 2- 8 | 8 | +1 1/2 | +23.0 | O | GENERAL AUTOMATION | 9- 42 | 17 | 0 | 0.0 |
| A | COMPUTING & SOFTWARE | 16- 75 | 32 3/8 | +3 3/4 | +13.1 | N | GENERAL ELECTRIC | 60-106 | 99 7/8 | - 1/4 | -0.2 |
| O | COMRESS | 1- 10 | 1 7/8 | - 1/8 | -6.2 | N | HEWLETT-PACKARD CO | 19- 45 | 33 5/8 | + 3/4 | +2.2 |
| O | COMSHARE | 2- 15 | 5 7/8 | + 3/4 | +14.6 | N | HONEYWELL INC | 65-152 | 88 3/4 | +2 | +2.3 |
| O | CONSOL. ANAL. CENT. | 1- 4 | 1 5/8 | + 1/4 | +18.1 | N | IBM | 223-387 | 317 1/2 | +2 | +0.6 |
| O | DATA AUTOMATION | 1- 24 | 1 3/4 | - 1/8 | -6.6 | O | INTERDATA INC | 3- 22 | 7 3/8 | +1 3/4 | +31.1 |
| O | DATA PACKAGING | 5- 29 | 8 | 0 | 0.0 | N | MCR | 30- 86 | 38 | - 5/8 | -1.6 |
| O | DATAMATION SERVICE | 1- 6 | 1 7/8 | - 1/8 | -6.2 | N | RCA | 18- 34 | 30 1/4 | + 1/2 | +1.6 |
| O | DATATAB | 4- 9 | 7 3/4 | +2 | +34.7 | N | RAYTHEON CO | 16- 33 | 32 | - 1/2 | -1.5 |
| O | DIGITEK | 1- 5 | 1 5/8 | 0 | 0.0 | O | SCI. CONTROL CORP. | 1- 8 | 3/4 | 0 | 0.0 |
| O | EDP RESOURCES | 5- 13 | 7 1/4 | + 1/4 | +3.5 | N | SPERRY RAND | 19- 40 | 28 5/8 | +2 3/8 | +9.0 |
| A | ELECT COMP PROG | 3- 11 | 4 1/4 | + 1/8 | +3.0 | A | SYSTEMS ENG. LABS | 10- 49 | 15 7/8 | + 1/8 | +0.7 |
| O | ELECTRONIC DATA SYS. | 31-161 | 73 1/2 | -2 1/2 | -3.2 | N | VARIAN ASSOCIATES | 9- 29 | 14 3/4 | + 1/4 | +1.7 |
| O | INFORMATICS | 4- 21 | 8 1/8 | +1 1/8 | +16.0 | N | WANG LABS. | 18- 51 | 31 7/8 | 0 | 0.0 |
| A | ITEL | 6- 26 | 17 3/8 | 0 | 0.0 | N | XEROX CORP | 66-115 | 95 | +7 | +7.9 |
| O | LEVIN-TOWNSEND SERV. | 1- 13 | 4 1/2 | - 1/8 | -2.7 | LEASING COMPANIES | | | | | |
| A | MANAGEMENT DATA | 7- 25 | 8 1/2 | - 1/8 | -1.4 | O | BOOTHE COMPUTER | 8- 25 | 18 1/2 | +1 3/4 | +10.4 |
| O | NATIONAL CSS INC | 4- 16 | 8 3/4 | + 1/4 | +2.9 | O | BRESNAHAN COMP. | 2- 9 | 4 | 0 | 0.0 |
| O | NAT COMP ANALYSTS | 1- 8 | 1 5/8 | + 3/8 | +30.0 | O | COMPUTER EXCHANGE | 2- 8 | 4 3/4 | + 1/2 | +11.7 |
| O | NAT. COMP. SERV. | 2- 12 | 2 3/4 | 0 | 0.0 | A | COMPUTER INVSTRS GRP | 4- 12 | 9 1/8 | -1 | -9.8 |
| N | PLANNING RESEARCH | 13- 54 | 21 3/8 | +2 7/8 | +15.5 | N | DATA PROC. F & G | 6- 32 | 15 1/4 | +2 3/8 | +18.4 |
| O | PROGRAMMING METHODS | 9- 27 | 19 1/2 | +1 | +5.4 | O | DATRONIC RENTAL | 2- 8 | 3 3/8 | + 7/8 | +35.0 |
| L | PROGRAMMING & SYS | 2- 5 | 2 1/4 | 0 | 0.0 | A | DEARBORN COMPUTER | 10- 27 | 26 | + 1/2 | +1.9 |
| L | PROGRAMMING SCIENCES | 1- 33 | 1 1/2 | + 5/8 | +71.4 | O | DIEBOLD COMP. LEAS. | 2- 8 | 6 3/4 | + 5/8 | +10.2 |
| N | SCIENTIFIC RESOURCES | 2- 22 | 3 3/4 | + 1/8 | +3.4 | A | DPA, INC. | 3- 10 | 4 7/8 | - 1/2 | -9.3 |
| O | SOFTWARE SYSTEMS | 1- 3 | 3/8 | + 1/8 | +50.0 | A | GRANITE MGT | 7- 22 | 9 1/4 | + 1/4 | +2.7 |
| O | TBS COMPUTER CENTERS | 4- 27 | 8 1/4 | - 1/2 | -5.7 | A | GREYHOUND COMPUTER | 5- 44 | 8 7/8 | 0 | 0.0 |
| O | UNITED DATA CENTER | 1- 4 | 2 1/4 | - 1/4 | -10.0 | N | LEASCO DATA PROC. | 7- 30 | 17 1/2 | + 1/2 | +2.9 |
| N | UNIVERSITY COMPUTING | 14- 99 | 25 5/8 | +2 3/8 | +10.2 | O | LECTRO MGT INC | 1- 9 | 1 5/8 | 0 | 0.0 |
| A | URS SYSTEMS | 5- 21 | 9 | +1 | +12.5 | A | LEVIN-TOWNSEND CMP | 3- 19 | 5 1/2 | + 3/8 | +7.3 |
| O | U.S. TIME SHARING | 1- 14 | 1 5/8 | - 3/8 | -18.7 | O | LHC DATA, INC. | 1- 4 | 1 | - 1/8 | -11.1 |
| PERIPHERALS & SUBSYSTEMS | | | | | | | | | | | |
| N | ADDRESSOGRAPH-MULT | 20- 62 | 29 1/2 | +4 1/2 | +18.0 | O | NCC INDUSTRIES | 3- 8 | 5 1/8 | + 3/8 | +7.8 |
| O | ALPHANUMERIC | 2- 15 | 3 1/4 | 0 | 0.0 | O | SYSTEMS CAPITAL | 1- 8 | 4 3/8 | -1 | -18.6 |
| N | AMPEX CORP | 13- 48 | 20 5/8 | +3 3/4 | +22.2 | N | U.S. LEASING | 3- 19 | 18 1/2 | + 1/4 | +1.3 |
| O | ASTRODATA | 1- 34 | 1 1/8 | 0 | 0.0 | EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID (1) TO NEAREST DOLLAR | | | | | |
| O | ATLANTIC TECHNOLOGY | 2- 14 | 3 1/2 | + 3/8 | +12.0 | | | | | | |
| A | BOLT, BERANEK & NEW | 3- 11 | 6 1/8 | + 1/8 | +2.0 | | | | | | |
| N | BUNKER-RAMO | 6- 14 | 11 1/2 | + 7/8 | +8.2 | | | | | | |
| A | CALCOMP | 11- 36 | 27 1/8 | +2 1/2 | +10.1 | | | | | | |
| O | COGNITRONICS | 3- 13 | 5 1/2 | - 1/4 | -4.3 | | | | | | |
| O | COLORADO INSTRUMENTS | 5- 12 | 4 3/4 | 0 | 0.0 | | | | | | |
| O | COMPUTER COMMUN. | 5- 36 | 5 5/8 | 0 | 0.0 | | | | | | |
| A | COMPUTER EQUIPMENT | 4- 12 | 4 3/4 | - 1/8 | -2.5 | | | | | | |
| A | COMPUTEST | 12- 28 | 14 3/4 | + 3/4 | +5.3 | | | | | | |
| O | CONSOL COMPUTER LTD. | 4- 14 | 10 | 0 | 0.0 | | | | | | |
| A | DATA PRODUCTS CORP | 5- 26 | 7 5/8 | + 1/2 | +7.0 | | | | | | |
| O | DATA TECHNOLOGY | 2- 23 | 5 1/8 | + 5/8 | +13.8 | | | | | | |
| O | DIGITRONICS | 3- 13 | 5 | - 1/4 | -4.7 | | | | | | |
| N | ELECTRONIC M & M | 7- 40 | 9 7/8 | + 1/2 | +5.3 | | | | | | |
| O | FABRI-TEK | 2- 8 | 3 | 0 | 0.0 | | | | | | |
| O | FARRINGTON MFG | 1- 17 | 1 3/4 | - 1/8 | -6.6 | | | | | | |
| O | INFORMATION DISPLAYS | 4- 20 | 6 3/4 | + 5/8 | +10.2 | | | | | | |
| O | KEYDATA CORP | 7- 14 | 12 1/4 | 0 | 0.0 | | | | | | |
| O | MANAGEMENT ASSIST | 1- 4 | 1 1/8 | + 1/8 | +12.5 | | | | | | |
| A | MARSHALL INDUSTRIES | 14- 67 | 21 | - 1/2 | -2.3 | | | | | | |
| A | MILGO ELECTRONICS | 15- 42 | 23 3/4 | + 1/8 | +0.5 | | | | | | |
| N | MOHAWK DATA SCI | 19- 87 | 29 | +3 5/8 | +14.2 | | | | | | |
| O | OPTICAL SCANNING | 11- 52 | 16 | +1 1/2 | +10.3 | | | | | | |
| O | PHOTON | 4- 17 | 7 1/2 | - 5/8 | -7.6 | | | | | | |
| O | PHOTO-MAGNETIC SYS. | 1- 6 | 3/4 | 0 | 0.0 | | | | | | |
| A | POTTER INSTRUMENT | 15- 42 | 21 3/4 | +1 | +4.8 | | | | | | |
| O | PRECISION INST. | 6- 25 | 10 3/4 | +1 3/4 | +19.4 | | | | | | |
| O | RECOGNITION EQUIP | 12- 83 | 15 1/8 | -1 7/8 | -11.0 | | | | | | |
| O | REDCOR CORP. | 4- 34 | 5 7/8 | +1 1/4 | +27.0 | | | | | | |
| N | SANDERS ASSOCIATES | 7- 29 | 14 7/8 | - 1/4 | -1.6 | | | | | | |
| O | SCAN DATA | 5- 53 | 10 1/2 | +1 5/8 | +18.3 | | | | | | |
| O | TALLY CORP. | 10- 23 | 14 3/4 | +1 1/2 | +11.3 | | | | | | |
| N | TELEX | 10- 25 | 15 3/4 | 0 | 0.0 | | | | | | |
| O | VIATRON | 1- 51 | 2 | + 5/8 | +45.4 | | | | | | |
| SUPPLIES & ACCESSORIES | | | | | | | | | | | |
| N | ADAMS-MILLIS CORP | 8- 17 | 16 | + 5/8 | +4.0 | | | | | | |
| O | BALTIMORE BUS FORMS | 6- 21 | 8 1/4 | + 1/4 | +3.1 | | | | | | |
| A | BARRY WRIGHT | 6- 25 | 9 3/4 | +1 1/4 | +14.7 | | | | | | |
| A | DATA DOCUMENTS | 15- 35 | 20 7/8 | + 5/8 | +3.0 | | | | | | |
| N | ENNIS BUS. FORMS | 9- 19 | 13 | +1 3/8 | +11.8 | | | | | | |
| O | GRAHAM MAGNETICS | 4- 13 | 13 1/8 | + 5/8 | +5.0 | | | | | | |
| O | GRAPHIC CONTROLS | 5- 17 | 7 3/4 | + 1/2 | +6.8 | | | | | | |
| N | MEMOREX | 46-156 | 62 | +4 1/4 | +7.3 | | | | | | |
| N | 3M COMPANY | 71-114 | 98 1/8 | +1 1/8 | +1.1 | | | | | | |
| O | MOORE BUS. FORMS | 25- 39 | 37 3/4 | 0 | 0.0 | | | | | | |
| N | NASHUA CORP | 21- 43 | 34 1/2 | - 1/4 | -0.7 | | | | | | |
| O | REYNOLDS & REYNOLD | 25- 42 | 41 | +1 | +2.5 | | | | | | |

Computer Stocks Trading Index

Computer Systems Software & EDP Services
Peripherals & Subsystems Leasing Companies
Supplies & Accessories CW Composite Index

BASE FOR EACH TRADING INDEX: 100 as of 1/1/69

Earnings Reports

APPLIED MAGNETICS CORP.
Three Months Ended Dec. 31

| | | |
|----------|-----------|-----------|
| | 1970 | 1969 |
| Shr Ernd | \$0.05 | \$0.09 |
| Revenue | 5,810,834 | 5,168,022 |
| Earnings | 208,210 | 362,127 |

a-Adjusted for a two-for-one stock split in January 1970.

AUTOMATIC DATA PROCESSING
Six Months Ended Dec. 31

| | | |
|----------|------------|------------|
| | 1970 | a1969 |
| Shr Ernd | \$0.36 | \$0.27 |
| Revenue | 22,198,136 | 17,670,705 |
| Earnings | 1,956,981 | 1,364,309 |

a-Restated to include companies acquired in pooling-of-interest transactions.

AUTOMATION TECHNOLOGY INC.
Year Ended June 30

| | | |
|---------|-------------|-------------|
| | 1970 | a1969 |
| Revenue | \$4,633,076 | \$3,393,502 |
| Loss | 2,374,155 | 1,262,591 |

a-Restated on consolidated basis.

BURROUGHS CORP.
Year Ended Dec. 31

The Librarian.

It saves time.

And money.

Maybe even your company.

An effective source program retrieval and maintenance system.
The Librarian.

Can save a programmer time in the clerical and mechanical tasks necessary for program maintenance. A simple set of commands controls all maintenance activity including updating, reorganizing, documenting and debugging.

The Librarian.

Can save money by cutting down machine time. All source modules are stored on disk or tape... not slow reading cards.

The Librarian.

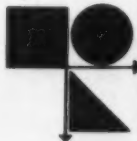
It might even save your company by protecting one of your most important assets... your programs.

The Librarian makes an auditor's job simpler and provides the necessary project control for a clean, secure system. One not likely to be sabotaged. One not likely to be tampered with. And there are no cards so there's no danger of shuffling, tearing, or dropping.

A master file contains relevant information pertaining to the status of all programs and a listing of all action taken. A master file index provides quick access to the contents of the master file.

An Update Record lists all operations performed in the current run. A Summary of Activity lets you know how modules are affected and cites any errors found. A permanent record of all activities for any source program is stored on master tapes for easy retrieval.

Call your nearest ADR office for a quick and simple presentation of how the Librarian can work in your system. Everyone can stand to save time and money. No one can afford to lose their programs or their company. For any reason.



APPLIED DATA RESEARCH
THE SOFTWARE BUILDERS
CREATORS OF AUTOFLOW, LIBRARIAN, PI SORT, ROSCOE, SAM, METACOBOL, IAM AND STAR.

NEW FEATURE: COBOL SYNTAX CHECKER. A syntax checker has recently been added to the Librarian to enable a user to rapidly check the syntax of a COBOL source program as it is being updated. The checker will increase programmer efficiency and accuracy, as well as save COBOL compiling time.

Call your nearest ADR office:

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